







ENCYCLOPÆDIA BRITANNICA;
OR, A
DICTIONARY
OF
ARTS, SCIENCES, &c.

On a PLAN entirely New:

BY WHICH,
THE DIFFERENT SCIENCES AND ARTS
Are digested into the Form of Distinct
TREATISES OR SYSTEMS,

COMPREHENDING

The HISTORY, THEORY, and PRACTICE, of each,
according to the Latest Discoveries and Improvements;

AND FULL EXPLANATIONS ARE GIVEN OF THE
VARIOUS DETACHED PARTS OF KNOWLEDGE,

WHETHER RELATING TO

NATURAL and ARTIFICIAL Objects, or to Matters ECCLESIASTICAL,
CIVIL, MILITARY, COMMERCIAL, &c.

TOGETHER WITH

A DESCRIPTION of all the Countries, Cities, principal Mountains, Seas, Rivers, &c. throughout
the World; a General HISTORY, *Ancient* and *Modern*, of the different Empires, Kingdoms,
and States; and an Account of the LIVES of the most Eminent Persons in every Nation,
from the earliest ages down to the present times.

THE WHOLE COMPILED FROM
THE WRITINGS OF THE BEST AUTHORS, IN SEVERAL LANGUAGES; THE MOST APPROVED DICTIONARIES,
AS WELL OF GENERAL SCIENCE AS OF PARTICULAR BRANCHES; THE TRANSACTIONS, JOURNALS, AND MEMOIRS, OF LEARNED
SOCIETIES, BOTH AT HOME AND ABROAD; THE MS. LECTURES OF EMINENT PROFESSORS ON DIFFERENT SCIENCES;
AND A VARIETY OF ORIGINAL MATERIALS, FURNISHED BY AN EXTENSIVE CORRESPONDENCE.

The SECOND EDITION; greatly Improved and Enlarged.

ILLUSTRATED WITH ABOVE TWO HUNDRED COPPERPLATES.

VOL. V.

INDOCTI DISCANT, ET AMEN MEMINISSE PERITI.

EDINBURGH:

Printed for J. BALFOUR and Co. W. GORDON, J. BELL, J. DICKSON, C. ELLIOT, W. CREECH,
J. MCCLIESH, A. BELL, J. HUTTON, and C. MACFARQUHAR.

MDCCCLXXX.

Encyclopedia Britannica
OF A
DICTIONARY
OF
ARTS, SCIENCES, &c.

On a Plan entirely New;

By William

THE DIFFERENT SCIENCES AND ARTS

are brought into the Form of Dialogues

TREATISES or SYSTEMS

of each

The History, Theory, and Practice of each,

according to the latest Discoveries and Improvements;

By James Mackintosh

VARIOUS DETAILS OF KNOWLEDGE

AND A HISTORY OF THE ARTS AND MANUFACTURES

OF GREAT BRITAIN AND IRELAND



THE HISTORY OF THE ARTS AND MANUFACTURES OF GREAT BRITAIN AND IRELAND, IN THE PRESENT STATE OF IMPROVEMENT, AND THE PROGRESS OF THE ARTS AND MANUFACTURES, FROM THE EARLIEST PERIODS OF HISTORY TO THE PRESENT TIME.

THE HISTORY OF THE ARTS AND MANUFACTURES OF GREAT BRITAIN AND IRELAND, IN THE PRESENT STATE OF IMPROVEMENT, AND THE PROGRESS OF THE ARTS AND MANUFACTURES, FROM THE EARLIEST PERIODS OF HISTORY TO THE PRESENT TIME.

THE HISTORY OF THE ARTS AND MANUFACTURES OF GREAT BRITAIN AND IRELAND, IN THE PRESENT STATE OF IMPROVEMENT, AND THE PROGRESS OF THE ARTS AND MANUFACTURES, FROM THE EARLIEST PERIODS OF HISTORY TO THE PRESENT TIME.

THE HISTORY OF THE ARTS AND MANUFACTURES OF GREAT BRITAIN AND IRELAND, IN THE PRESENT STATE OF IMPROVEMENT, AND THE PROGRESS OF THE ARTS AND MANUFACTURES, FROM THE EARLIEST PERIODS OF HISTORY TO THE PRESENT TIME.

THE HISTORY OF THE ARTS AND MANUFACTURES OF GREAT BRITAIN AND IRELAND, IN THE PRESENT STATE OF IMPROVEMENT, AND THE PROGRESS OF THE ARTS AND MANUFACTURES, FROM THE EARLIEST PERIODS OF HISTORY TO THE PRESENT TIME.

Dictionary of Arts, Sciences, &c.

G.

G A B

G, THE seventh letter, and fifth consonant, of our alphabet; tho' in the alphabets of all the oriental languages, the Hebrew, Phœnician, Chaldee, Syriac, Samaritan, Arabic, and even Greek, *G* is the third letter. See **LETTER**.

The Hebrews call it *ghimel*, or *gimel*, *q. d.* "camel;" by reason it resembles the neck of that animal; and the same appellation it bears in the Samaritan, Phœnician, and Chaldee; in the Syriac it is called *gamel*, in Arabic *gimm*, and in Greek *gamma*.

The letter *G* is of the mute kind, and cannot be any way founded without the help of a vowel. It is formed by the reflexion of the air against the palate, made by the tongue as the air passes out of the throat: which Martianus Capella expresses thus, *G spiritus cum palato*; so that *G* is a palatal letter.

The form of our *G* is taken from that of the Latins, who borrowed it from the Greeks; the Latin *G* being certainly a corruption of the Greek gamma, *γ*, as might easily be shewn, had our Printers all the characters and forms of this letter which we meet withal in the Greek and Latin MSS thro' which the letter passed from *γ* to *G*.

In English it has a hard and soft sound: hard, as in the words *game*, *gun*, &c.; and soft, as in the words *gesture*, *giant*, &c. At the end of words, *gh* is pronounced like *ff*, as in the words *rough*, *tough*, &c. The letter *g* is also used in many words where the sound is not perceived, as in *sign*, *reign*, &c.

As a numeral, *G* was anciently used to denote 400; and with a dash over it thus *Ḡ*, 40,000. In music, it is the character or mark of the treble cleff; and from its being placed at the head, or marking the first sound, in Guido's scale, the whole scale took the name *gamut*. See the articles **CLEFF** and **GAMUT**.

As an abbreviation, *G*. stands for *Gaius*, *Gellius*, *gens*, *genius*, &c. *G. G.* for *gemina*, *gestit*, *gesserunt*, &c. *G. C.* for *genio civitatis* or *Cesaris*. *G. L.* for *Gaius libertus*, or *genio loci*. *G. V. S.* for *genio urbis sacrum*. *G. B.* for *genio bono*. And *G. T.* for *genio tutelari*.

GABARA, or **GABBARA**, in antiquity, the dead bodies which the Egyptians embalmed, and kept in their houses, especially those of such of their friends as

G A B

died with the reputation of great piety and holiness, or as martyrs. See **EMBALMING**, and **MUMMY**.

GABEL, (*Gabella*, *Gabulum*, *Gablagium*), in French *Gabelle*, i. e. *Vedtigal*, hath the same signification among the ancient English writers, that *gabelle* hath in France. It is a tax; but hath been variously used, as for a rent, custom, service, &c. And where it was a payment of rent, those who payed it were termed *gablatores*. When the word *gabel* was formerly mentioned without any addition to it, it signified the tax on salt, though afterwards it was applied to all other taxes.

GABIONS, in fortification, baskets made of ozier-twigs, of a cylindrical form, six feet high, and four wide; which, being filled with earth, serve as a shelter from the enemy's fire.

GABLE, or **GABLE-End** of a house (from *gaval*, *Welsh*), is the upright triangular end, from the cornice or eaves, to the top of the house.

GABRIEL, the name of one of the principal angels in heaven. It signifies *the strength of God*. There are a few events, in which this exalted being was concerned, recorded in scripture. He was sent to the prophet Daniel, to explain to him the vision of the ram and goat, and the mystery of the seventy weeks, which had been revealed to him. He was sent to Zecharias, to declare to him the future birth of John the baptist. Six months after, he was sent to Nazareth, to the Virgin Mary, to warn her of the birth of Jesus Christ.

The Orientalists add several particulars to what the scriptures inform us concerning the angel Gabriel. The Mahometans call him the *faithful spirit*; and the Persians, by way of metaphor, the *peacock of heaven*. We read, in the second chapter of the Koran, that *whosoever is an enemy to Gabriel, shall be confounded*. It was Gabriel, they believe, who brought to Mahomet, their false prophet, the revelations which he published; and it was he, who conducted him to heaven mounted upon the animal Borak.

GAD, among miners, a small punch of iron, with a long wooden handle, used to break up the ore.

One of the miners holds this in his hand, directing the point to a proper place, while the other drives it into the vein, by striking it with a sledge-hammer.

Gad,
Gadus.

GAD-Bee, or *Gad-fly*, in natural history, the common name for a winged insect, called also the *dun-fly* or *ox-fly*; a creature very troublesome to cows, horses, &c. This creature examined by the microscope hath some peculiarities worthy of observation. It has, like the gnat, a long proboscis, with a sharp dart or two darts sheathed within it; the tip of these darts is to penetrate the flesh of animals for the sucking their blood, whereas the proboscis can only serve to suck the dews from flowers, &c.

The eggs of this fly are laid in the waters, and there produce a very remarkable sort of maggot. It is a brown one of a long flattened figure, with a pencil of down-hairs at its tail, which it spreads into a circular form on the surface of the water, while its head is sunk down in search of food. When the creature would descend towards the bottom, these hairs are made to approach one another in an oval form; and in this state they inclose a bubble of air, by means of which it is able to rise again; and if this bubble by any accident escapes, the creature immediately squeezes out of its own body another to supply its place. The finout of this maggot hath three divisions; whence are thrust out three little pointed bodies like serpents tongues. These maggots are very common on the surface of ditch-water; and the motion of their intestines is very singular and observable.

GADUS, in ichthyology, a genus of fishes belonging to the order of jugulares. The head is smooth; there are seven cylindrical rays in the branchiostegic membrane; the body is oblong, with deciduous scales; the whole fins are covered with the common skin of the fish; the rays of the back-fins are blunt, and those of the breast are sharp. There are 17 species, principally distinguished by their cirri and the number of back-fins. The most remarkable are,

1. *The morhua*, or common cod, is found only in the northern parts of the world; it is, as Rondeletius calls it, an ocean fish, and never met with in the Mediterranean sea. It affects cold climates, and seems confined between the latitudes 66° and 50°: what are caught north and south of those degrees being either few in quantity or bad in quality. The Greenland fish are small, and emaciated through want of food; being very voracious, and having in those seas a scarcity of provision. This locality of situation is common to many other species of this genus, most of them being inhabitants of the cold seas, or such as lie within regions that can just claim the title of *temperate*. There are nevertheless certain species found near the Canary-islands, called *cherry*, of which we know no more than the name; but which, according to Captain Glas, are better tasted than the Newfoundland kind.

The great rendezvous of the cod-fish is on the banks of Newfoundland, and the other sand-banks that lie off the coasts of Cape Breton, Nova Scotia, and New England. They prefer those situations, by reason of the quantity of worms produced in those sandy bottoms, which tempt them to resort there for food: but another cause of the particular attachment the fish have to these spots, is their vicinity to the polar seas, where they return to spawn: there they deposit their roes in full security; but want of food forces them, as soon as the first more southern seas are open, to repair thither for subsistence. Few are taken north of Iceland, but on

the south and west coasts they abound; they are again found to swarm on the coasts of Norway, in the Baltic, off the Orkney and the Western isles; after which their numbers decrease, in proportion as they advance towards the south, when they seem quite to cease before they reach the mouth of the Straits of Gibraltar.

Before the discovery of Newfoundland, the greater fisheries of cod were on the seas of Iceland, and off our Western Isles, which were the grand resort of ships from all the commercial nations; but it seems that the greatest plenty was met with near Iceland. The English resorted thither before the year 1415: for we find that Henry V. was disposed to give the king of Denmark satisfaction for certain irregularities committed on those seas by his subjects. In the reign of Edward IV. the English were excluded from the fishery by treaty; and forbidden to resort there under pain of forfeiture of life and goods. Notwithstanding this, that monarch afterwards gave licence to a ship of Hull to sail to Iceland, and there relapse fish and other goods, without regard to any restrictions to the contrary. The right of the English in latter times was far from being confirmed: for we find queen Elizabeth condescending to ask permission to fish in those seas from Christian IV. of Denmark; yet afterwards she so far repented her request, as to instruct her ambassadors at that court to insist on the right of a free and universal fishery. In the reign of her successor, however, they had not fewer than 150 ships employed in the Iceland fishery; which indulgence might arise from the marriage of James with a princess of Denmark. But the Spanish, the French, and the Bretons, had much the advantage of the English in all fisheries at the beginning, as appears by the state of that in the seas of Newfoundland in the year 1578, when the number of ships belonging to each nation stood thus:

Spaniards, 100; besides 20 or 30 that came from Biscay to take whale for train, being about five or six thousand tons.

Portuguese 50, or three thousand tons.

French and Bretons 150, or seven thousand tons.

English, from 30 to 50.

The increase of shipping that resort to those fertile banks, is now unspeakable. Britain still enjoys the greatest share; which ought to be esteemed our chiefest treasure, as it brings wealth to individuals, and strength to the state. See **FISHERY**.

All this immense fishery is carried on by the hook and line only. We have been informed that they fish from the depth of 16 to 60 fathoms, according to the inequality of the bank, which is represented as a vast mountain, under water, above 500 miles long, and near 300 broad; and that seamen know when they approach it by the great swell of the seas and the thick mists that impend over it. The bait is herring, a small fish called a *capelin*, a shell-fish called *clam*, and bits of sea-fowl; and with these are caught fish sufficient to find employ for near 15,000 British seamen, and to afford subsistence to a much more numerous body of people at home, who are engaged in the various manufactures which so vast a fishery demands.

The food of the cod is either small fish, worms, testaceous or crustaceous animals, such as crabs, large welks, &c.; and their digestion is so powerful, as to

dissolve

Gadus.

The Cod.

Gadus. dissolve the greatest part of the shells they swallow. They are very voracious, and catch at any small body they perceive moved by the water, even stones and pebbles, which are often found in their stomachs.

The Cod. Fishermen are well acquainted with the use of the air-bladder or found of the cod; and are very dexterous in perforating this part of a live fish with a needle, in order to disengage the inclosed air: for without this operation it could not be kept under water in the well-boats, and brought fresh to market. The sounds of the cod salted is a delicacy often brought from Newfoundland. Lingslafs is also made of this part by the Iceland fishermen: a process which deserves the attention of the natives of the north of Scotland, where these fish are plentiful. It is given under the article *ICHTHYOCOLLA*.

Providence hath kindly ordained, that this fish, so useful to mankind, should be so very prolific as to supply more than the deficiencies of the multitudes annually taken. Leuwenhoeck counted 9,384,000 eggs in a cod-fish of a middling size; a number, sure, that will baffle all the efforts of man, or the voracity of the inhabitants of the ocean, to exterminate, and which will secure to all ages an inexhaustible supply of grateful provision.

In our seas they begin to spawn in January, and deposit their eggs in rough ground, among rocks. Some continue in roe till the beginning of April. The cod-fish in general recover quicker after spawning than any other fish, therefore it is common to take some good ones all the summer. When they are out of season, they are thin-tailed and bony; and the lice chiefly fix themselves on the inside of their mouths.

The fish of a middling size are most esteemed for the table; and are chosen by their plumpness and roundness, especially near the tail, by the depth of the sulcus or pit behind the head, and by the regular undulated appearance of the sides, as if they were ribbed. The glutinous parts about the head lose their delicate flavour after it has been 24 hours out of the water, even in winter, in which these and other fish of this genus are in highest season.

The largest that we ever heard of taken on our coasts, weighed 78 pounds: the length was five feet eight inches; and the girth round the shoulders, five feet. It was taken at Scarborough in 1755, and was sold for one shilling. But the general weight of these fish in the Yorkshire seas, is from 14 to 40 pounds. This species is short in proportion to its bulk, the belly being very large and prominent.

The jaws are of an equal length, and at the end of the lower is a small beard; the teeth are disposed in the palate as well as in the jaws.

The colour of this fish is cinereous on the back and sides, and commonly spotted with yellow: the belly is white; but they vary much, not only in colour but in shape, particularly that of the head. The side line is white and broad, straight till it reaches opposite the vent, when it bends towards the tail. Codlings are often taken of a yellow, orange, and even red colour, while they remain among the rocks; but, on changing their place, assume the colour of other cod-fish.

2. The *Eglefinus*, or *Haddock*. Large haddocks begin to be in roe in the middle of November, and continue so till the end of January; from that time

till May they are very thin tailed, and much out of season. In May they begin to recover; and some of the middling-sized fish are then very good, and continue improving till the time of their greatest perfection. The small ones are extremely good from May till February, and some even in February, March, and April, viz. those which are not old enough to breed.

The fishermen assert, that in rough weather haddocks sink down into the sand and ooze in the bottom of the sea, and shelter themselves there till the storm is over; because in stormy weather they take none, and those that are taken immediately after a storm are covered with mud on their backs.

In summer they live on young herrings and other small fish; in winter, on the stone-coated worms*, * a species of *Serpula*.

The grand shoal of haddocks comes periodically on the Yorkshire coasts. It is remarkable that they appeared in 1766 on the 10th of December, and exactly on the same day in 1767: these shoals extended from the shore near three miles in breadth, and in length from Flamborough-head to Timmouth-castle, and perhaps much farther northwards. An idea may be given of their numbers by the following fact: Three fishermen, within the distance of a mile from Scarborough harbour, frequently loaded their coble or boat with them twice a-day, taking each time about a ton of fish: when they put down their lines beyond the distance of three miles from the shore, they caught nothing but dog-fish, which shows how exactly these fish keep their limits.

The best haddocks were sold from eightpence to a shilling *per score*; and the poor had the smaller sort at a penny and sometimes a halfpenny *per score*.

The large haddocks quit the coast as soon as they go out of season, and leave behind great plenty of small ones. It is said that the large ones visit the coasts of Hamburg and Jutland in the summer.

It is no less remarkable than providential, that all kinds of fish (except mackrel) which frequent the Yorkshire coast, approach the shore, and as it were offer themselves to us, generally remaining there as long as they are in high season, and retire from us when they become unfit for use. It is the commonest species in the London markets. They do not grow to a great bulk, one of 14 pounds being of an uncommon size, but those are extremely coarse; the best for the table weighing from two to three pounds.

The body of the haddock is long: the head slopes down to the nose: the space between the hind-part of the first dorsal-fin is rigid: on the chin is a short beard. On the back are three fins resembling those of the common cod-fish: on each side beyond the gills is a large black spot. Superstition assigns this mark to the impression St Peter left with his finger and thumb when he took the tribute out of the mouth of a fish of this species, which has been continued to the whole race of haddocks ever since that miracle. The lateral line is black: the tail is forked. The colour of the upper part of the body is dusky or brown; the belly and lower part of the sides silvery.

3. The *Barbatius*, or *ROUT*, never grows to a large size, seldom exceeding a foot in length. It is distinguished from all others by its great depth; one of the size abovementioned being near four inches deep

Gadus.

in the broadest part. The back is very much arched, and carinated: the colour of the fins and tail are black: at the bottom of the pectoral fins is a black spot. The lateral line is white, broad, and crooked. The tail is even at the end, and of a dusky colour. The colour of the body is white, but more obscure on the back than the belly, and tinged with yellow.—It is called at Scarborough a *kleg*, and is a very delicate fish.

4. The *Minutus*, or *POOR*, is the only species of cod-fish with three dorsal fins that we (at this time) are assured is found in the Mediterranean sea. It is taken near Marseilles, and sometimes in such quantities as to become a nuisance; for no other kinds of fish are taken during their season. It is esteemed good, but incapable of being salted or dried: Belon says, that when it is dried in the sun, it grows as hard as horn. It is the smallest species yet discovered, being little more than six inches long. On the chin is a small beard: the eyes are covered with a loose membrane: on the gill-covers and the jaws, there are, on each side, nine punctures. The colour on the back is a light brown; on the belly a dirty white.—We owe the discovery of this kind in our seas to the Reverend Mr Jago.

The Poor-fish.

5. The *Carbonarius*, or *COAL-FISH*, takes its name from the black colour that it sometimes assumes. Belon calls it the *colfish*, imagining that it was so named by the English, from its producing the Ichthyocolla; but Gesner gives the true etymology. These fish are common on most of our rocky and deep coasts, but particularly those of the north of Great Britain. They swarm about the Orkneys, where the fry are the great support of the poor. The young begin to appear on the Yorkshire coast the beginning of July in vast shoals, and are at that time about an inch and an half long. In August they are from three to five inches in length, and are taken in great numbers with the angling rod: they are then esteemed a very delicate fish; but grow so coarse when they are a year old, that few people will eat them. Fish of that age arc from eight to fifteen inches long, and begin to have a little blackness near the gills and on the back, and the blackness increases as they grow older.

The fry is known by different names in different places: they are called at Scarborough *parrs*, and when a year old, *billets*. About nine or ten years ago such a glut of parrs visited that part, that for several weeks it was impossible to dip a pail into the sea without taking some.

Though this fish is so little esteemed when fresh, yet it is salted and dried for sale. It is of a more elegant form than the cod-fish: they generally grow to the length of two feet and an half, and weigh about 28 or 30 pounds at most. The head is small; the under-jaw a little longer than the upper: the tail is broad and forked. They vary in colour: some have their back, nose, dorsal fins, and tail, of a deep black: the gill-covers, silver and black; the ventral and anal fins, white; the belly of the same colour. Others are dusky, others brown; but, in all, the lateral line is straight and white, and the lower part of the ventral and anal fins white.

6. The *Pollachiur*, or *POLLACK*, is common on many of our rocky coasts: during summer they are seen in great shoals frolicking on the surface of the water, and

flinging themselves into a thousand forms. They are at that time so wanton as to bite at any thing that appears on the top of the waves, and are often taken with a goose-feather fixed to the hook. They are very strong, being observed to keep their station at the feet of the rocks in the most turbulent and rapid sea. They are a good eating fish. They do not grow to a very large size; at least the biggest seldom exceed six or seven pounds: but some have been taken in the sea near Scarborough, which they frequent during winter, that weighed near 28 pounds. They are there called *lects*.

The under jaw is longer than the upper; the head and body rises pretty high, as far as the first dorsal fin. The side line is incurved, rising towards the middle of the back, then sinking and running straight to the tail; it is broad, and of a brown colour. The colour of the back is dusky, sometimes inclining to green: the sides beneath the lateral line marked with lines of yellow; the belly white.

7. The *merlangus*, or *WHITING*. These fish appear in vast shoals in our seas in the spring, keeping at the distance of about half a mile to that of three from the shore. They are caught in vast numbers by the line, and afford excellent diversion. They are the most delicate, as well as the most wholesome, of any of the genus: but they do not grow to a large size, the biggest not exceeding 20 inches; and even that is very uncommon, the usual length being 10 or 12; tho' it is said, that whittings, from four to eight pounds in weight, have been taken in the deep water at the edge of the Dogger-Bank.—It is a fish of an elegant make: the upper jaw is the longest; the eyes large, the nose sharp; the teeth of the upper jaw long, and appear above the lower when closed. The colour of the head and back is a pale brown; the lateral line white, and crooked; the belly and sides silvery, the last streaked lengthwise with yellow.

8. The *merlucius*, or *HAKE*, is found in vast abundance on many of our coasts, and of those of Ireland. There was formerly a vast stationary fishery of hake on the Nymph Bank off the coast of Waterford, immense quantities appearing there twice a year; the first shoal coming in June, during the mackerel-season; the other in September, at the beginning of the herring-season, probably in pursuit of those fish: it was no unusual thing for six men with hooks and lines to take a thousand hake in one night, besides a considerable quantity of other fish. These were salted and sent to Spain, particularly to Bilbao. We are at this time uninformed of the state of this fishery; but find that Mr Smith, who wrote the history of the county of Waterford, complains even in his time (1746) of its decline. Many of the gregarious fish are subject to change their situations, and desert their haunts for numbers of years, and then return again. Mr Smith instances the loss of the haddock on the Waterford shores, where they used to swarm; and we can bring the capriciousness of the herrings, which so frequently quit their stations, as another example.—Sometimes the irregular migration of fish is owing to their being followed and harassed by an unusual number of fish of prey, such as the shark-kind; sometimes to deficiency of the smaller fish, which served them as food; and lastly, in many places to the custom of trawling, which not only demolishes a quantity of

Gadus.

The Pollack.

The Whiting.

The Hake.

Gadus.

their spawn, which is deposited in the sand, but also detroys or drives into deeper waters numberless worms and insects, the repast of many fish.—The hake is in England esteemed a very coarse fish, and is seldom admitted to table either fresh or salted. When cured, it is known by the name of *Poor John*. These fish are from a foot and an half to near twice that length: they are of a slender make, of a pale ash-colour on their backs, and of a dirty white on their bellies.

The Ling.

10. The *molva*, or *ling*, takes its English name from its length, being corrupted from the word *long*. It abounds about the Scilly Isles, on the coasts of Scarborough, and those of Scotland and Ireland, and forms a considerable article of commerce. This branch of trade was considerable so long ago as the reign of Edward III. an act for regulating the price of lob, *ling*, and cod, being made in his 31st year.

In the Yorkshirc seas they are in perfection from the beginning of February to the beginning of May, and some till the end of that month. In June they spawn, depositing their eggs in the soft oozy ground of the mouth of the Tees: at that time the males separate from the females, and resort to some rocky ground near Flamborough-head, where the fishermen take great numbers without ever finding any of the female or roed fish among them.

While a ling is in season its liver is very white, and abounds with a fine-flavoured oil; but as soon as the fish goes out of season, the liver becomes red as that of a bullock, and affords no oil. The same happens to the cod and other fish in a certain degree, but not so remarkably as in the ling. When the fish is in perfection, a very large quantity of oil may be melted out of the liver by a slow fire; but if a violent sudden heat be used for that purpose, they yield very little. The oil, which nature hoards up in the cellular membraes of the fishes, returns into their blood, and supports them in the engendering season, when they pursue the business of generation with so much eagerness as to neglect their food.

Vast quantities of ling are salted for exportation, as well as for home-consumption. When it is cut or split for curing, it must measure 26 inches or upwards from the shoulder to the tail: if less than that, it is not reckoned a sizeable fish, and consequently not entitled to the bounty on exportation; such are called *drizzles*, and are in season all summer.

The usual size of a ling is from three to four feet; but they have been heard of seven feet long. The body is very slender; the head flat; the upper jaw the longest; the teeth in that jaw small and very numerous; in the lower, few, slender, and sharp: on the chin is a small beard. They vary in colour, some being of an olive hue on the sides and back, others cinereous; the belly white. The ventral fins white: the dorsal and anal edged with white. The tail marked near the end with a transverse black bar, and tipped with white.

The Burbot.

11. The *lota*, or *burbot*, is found in the Trent; but in greater plenty in the river Witham, and in the great east fen in Lincolnshire. It is a very delicate fish for the table, though of a disgusting appearance when alive. It is very voracious, and preys on the fry and lesser fish. It does not often take a bait, but is generally caught in weels. It abounds in the lake of Ge-

neva, where it is called *lota*; and it is also met with in the Lago Maggiore, and Lugano. The largest taken in our waters weigh between two and three pounds, but abroad they are sometimes found of double that weight. Their body has some resemblance to that of an eel, only shorter and thicker; and its motions also resemble those of that fish: they are besides very smooth, slippery, and slimy. The head is very ugly, being flat, and shaped like that of a toad: the teeth are very small, but numerous. On the end of the nose are two small beards; on the chin another. The colour varies: some are dusky, others are of a dirty green, spotted with black, and oftentimes with yellow; and the belly in some is white; but the real colours are frequently concealed by the slime.

12. The *myxela*, or *five-bearded cod*, very much resembles the former.

The beards on the upper jaw are four, viz. two at the very end of the noses and two a little above them: on the end of the lower jaw is a single one. The fish are of a deep olive brown, their belly whitish. They grow to the same size as the former.—The Cornish fishermen are said to whistle, and make use of the words *bod, bod, vean*, when they are desirous of taking this fish, as if by that they facilitated the capture. In the same manner the Sicilian fishermen repeat their *manassa di paganu*, &c. when they are in pursuit of the sword-fish.

13. The *torax*, or, as it is called in the Shetlands, The *Tusk*, *tusk* and *brismak*, is a northern fish; and as yet undiscovered lower than about the Orkneys, and even there it is rather scarce. In the seas about Shetland, it swarms, and forms (barrelled or dried) a considerable article of commerce. The length is about 20 inches, the greatest depth four and a half. The head is small; the upper jaw a little longer than the lower; both jaws furnished with multitudes of small teeth: on the chin is a small single beard: from the head to the dorsal fin is a deep furrow. The colour of the head is dusky: the back and sides yellow; belly white; edges of the dorsal, anal, and caudal fins, white; the other parts dusky; the pectoral-fins brown.

GAFF, a sort of boom or pole, frequently used in small ships, to extend the upper edge of the mizen; and always employed for the same purpose on those sails whose foremost edges are joined to the mast by hoops or lacing, and which are usually extended by a boom below. Such are the main-sails of all sloops, brigs, and schooners.

GAFFAREL (James), a French divine, and very learned writer, born about 1601. He acquired great skill in the oriental and several other languages; and was particularly versant in the cabalistic and occult sciences, which he learnedly exposed and refuted. Cardinal Richieu made choice of him for his library-keeper, and sent him into Italy to collect the best manuscripts and books. He published a book, intitled *Curiositez Inuueies*, i. e. Unheard-of Curiosities. It is said the cardinal designed to employ him in his grand project for the re-union of religions. He died in 1681, aged 80. He had been labouring for many years, and had almost finished, a history of the subterranean world; containing an account of the caves, grottoes, vaults, catacombs, and mines, he had met with in 30 years travels.

Gadus

Gaffarel.

Gagates

Gage.

GAGATES, or JET. See JET.

GAGE, in our ancient customs, signifies a pledge, or pawn, given by way of security. The word is only properly used in speaking of moveables; for immoveables, *hypotheca* is used.

If the gage perish, the person who received it is not to answer for it, but only for extreme negligence. &c.

GAGE, is also used for a challenge, to combat: See CARTEL. In which sense, it was a pledge, which the accuser or challenger cast on the ground, and the other took up as accepting the challenge: it was usually a glove, gauntlet, chaperoon, or the like. See COMBAT, and DUEL.

GAGE is only now retained as a substantive. As a verb, the G is changed into H, and of *gage* is formed *wage*; as, to wage law; to wage deliverance, *q. d.* to give security a thing shall be delivered. See WAGE.

If a person who has distrained be sued for not having delivered what he had taken by distress, he should wage, or gage, or gager, deliverance; that is, put in surety that he will deliver them.

Mort-GAGE, is that which is left in the hands of the proprietor, so that he reaps the fruits thereof.

In opposition to *viv-gage*, where the fruits or revenues are reaped by the creditor, and reckoned on the foot of the debt, which diminishes in proportion thereto. The second acquits or discharges itself; the first does not.

GAGE, in the sea-language. When one ship is to windward of another, she is said to have the weather-gage of her. They likewise call the number of feet that a vessel sinks in the water, the ship's *gage*: this they find by driving a nail into a pike near the end, and putting it down beside the rudder till the nail catch hold under it; then as many feet as the pike is under water, is the ship's *gage*.

GAGE, among letter-founders, a piece of box, or other hard wood, variously notched; the use of which is to adjust the dimensions, slopes, &c. of the different sorts of letters. See FOUNDRY.

Sliding-GAGE, a tool used by mathematical instrument-makers, for measuring and setting off distances.

Sea-GAGE, an instrument invented by Dr Hales and Dr Desaguliers, for finding the depth of the sea; the description whereof is this. AB (Plate CXV. fig. 1. n^o 1.) is the gage-bottle, in which is cemented the gage-tube *Ff* in the brass cap at G. The upper end of tube *F* is hermetically sealed, and the open lower end *f* is immersed in mercury, marked C, on which swims a small thickness or surface of treacle. On the top of the bottle is screwed a tube of brass HG, pierced with several holes to admit the water into the bottle AB. The body K is a weight hanging by its shank L, in a socket N, with a notch on one side at *m*, in which is fixed the catch *l* of the spring S, and, passing through the hole L, in the shank of the weight K, prevents its falling out when once hung on. On the top, in the upper part of the brass tube at H, is fixed a large empty ball, or full-blown bladder, I, which must not be so large, but that the weight K may be able to sink the whole under water.

The instrument, thus constructed, is used in the following manner. The weight K being hung on, the gage is let fall into deep water, and sinks to the bottom: the socket N is somewhat longer than the shank

L; and therefore, after the weight K comes to the bottom, the gage will continue to descend, till the lower part of the socket strikes against the weight: this gives liberty to the catch to fly out of the hole L, and let go the weight K: when this is done, the ball or bladder I, instantly buoys up the gage to the top of the water. While the gage is under water, the water having free access to the treacle and mercury in the bottle, will by its pressure force it up into the tube *Ff*, and the height to which it has been forced by the greatest pressure, viz. that at the bottom, will be shewn by the mark in the tube which the treacle leaves behind it, and which is the only use of the treacle. This shews into what space the whole air in the tube *Ff* is compressed; and consequently the height or depth of the water which by its weight produced that compression, which is the thing required.

If the gage-tube *Ff* be of glass, a scale might be drawn on it with the point of a diamond, shewing, by inspection, what height the water stands above the bottom. But the length of 10 inches is not sufficient for fathoming depths at sea, since that, when all the air in such a length of tube is compressed into half an inch, the depth of water is no more than 634 feet, which is not half a quarter of a mile.

If, to remedy this, we make use of a tube 50 inches long, which for strength may be a musket-barrel, and suppose the air compressed into an hundredth part of half an inch; then by saying, as 1 : 99 :: 400 : 39600 inches, or 3300 feet; even this is but little more than half a mile, or 2640 feet. But since it is reasonable to suppose the cavities of the sea bear some proportion to the mountainous parts of the land, some of which are more than three miles above the earth's surface; therefore, to explore such great depths, the doctor contrived a new form for his sea-gage, or rather for the gage-tube in it, as follows. BCDF (*ibid.* n^o 2.) is a hollow metalline globe communicating on the top with a long tube AB, whose capacity is a ninth part of that globe. On the lower part at D, it has also a short tube DE, to stand in the mercury and treacle. The air contained in the compound gage-tube is compressed by the water as before; but the degree of compression, or height to which the treacle has been forced, cannot there be seen through the tube; therefore, to answer that end, a slender rod of metal or wood, with a knob on the top of the tube AB, will receive the mark of the treacle, and shew it when taken out.

If the tube AB be 50 inches long, and of such a bore that every inch in length should be a cubic inch of air, and the contents of the globe and tube together 500 cubic inches; then, when the air is compressed within an hundredth part of the whole, it is evident the treacle will not approach nearer than 5 inches of the top of the tube, which will agree to the depth of 3300 feet of water as above. Twice this depth will compress the air into half that space nearly, viz. 2½ inches, which correspond to 6600, which is a mile and a quarter. Again, half that space, or 1½ inch, will shew double the former depth, viz. 13200 feet, or 2½ miles; which is probably very nearly the greatest depth of the sea.

Wind-GAGE, an instrument for measuring the force of the wind upon any given surface. It was invented by Dr Lind, who gives the following description of it

Gage.

of it, Phil. Trans. Vol. LXV.

Pl. CXLI. fig. 1. This instrument consists of two glass tubes AB, CD, of five or six inches in length. Their bores, which are so much the better for being equal, are about four tenths of an inch in diameter. They are connected together like a siphon by a small bent glass-tube ab , the bore of which is about one tenth of an inch in diameter. On the upper end of the leg AB there is a tube of latten brads, which is kneed, or bent perpendicularly outwards, and has its mouth open towards F. On the other leg CD, is a cover with a round hole G in the upper part of it, two tenths of an inch in diameter. This cover and the kneed tube are connected together by a slip of brads ed , which not only gives strength to the whole instrument, but also serves to hold the scale HI. The kneed tube and cover, are fixed on with hard cement or sealing wax. To the same tube is foldered a piece of brads e , with a round hole in it to receive the steel spindle KL; and at f there is just such another piece of brads foldered to the brads-hoop gb , which surrounds both legs of the instrument. There is a small shoulder on the spindle at f , upon which the instrument rests, and a small nut at i , to prevent it from being blown off the spindle by the wind. The whole instrument is easily turned round upon the spindle by the wind, so as always to present the mouth of the kneed tube towards it. The end of the spindle has a screw on it; by which it may be screwed into the top of a post or a stand made on purpose. It has also a hole at L, to admit a small lever for screwing it into wood with more readiness and facility. A thin plate of brads k is foldered to the kneed tube, about half an inch above the round hole G, so as to prevent rain from falling into it. There is likewise a crooked tube AB (fig. 2.) to be put occasionally upon the mouth of the kneed tube F; in order to prevent rain from being blown into the mouth of the wind-gage when it is left out all night, or exposed in the time of rain.

The force or momentum of the wind may be ascertained by the assistance of this instrument, by filling the tubes half full of water, and pushing the scale a little up or down, till the o of the scale, when the instrument is held up perpendicularly, be on a line with the surface of the water in both legs of the wind-gage. The instrument being thus adjusted, hold it up perpendicularly, and, turning the mouth of the kneed tube towards the wind, observe how much the water is depressed by it in the one leg, and raised in the other. The sum of the two is the height of a column of water, which the wind is capable of sustaining at that time; and every body that is opposed to that wind will be pressed upon by a force equal to the weight of a column of water, having its base equal to the altitude of the column of water sustained by the wind in the wind-gage. Hence the force of the wind upon any body where the surface opposed to it is known, may be easily found; and a ready comparison may be made betwixt the strength of one gale of wind and that of another.

The force of the wind may be likewise measured with this instrument, by filling it until the water runs out at the hole G. For if we then hold it up to the wind as before, a quantity of water will be blown out; and if both legs of the instrument are of the

same bore, the height of the column sustained will be equal to double the column of water in either leg, or the sum of what is wanting in both legs. But if the legs are of unequal bores, neither of these will give the true height of the column of water which the wind sustained. But the true height may be obtained by the following formulæ.

Suppose that after a gale of wind which had blown the water from A to B (fig. 3.) forcing it at the same time through the other tube out at E, the surface of the water should be found standing at some level DG, and it were required to know what was the height of the column EF or AB, which the wind sustained. In order to obtain this, it is only necessary to find the height of the columns DB or GF, which are constantly equal to one another; for either of these added to one of the equal columns AD, EG, will give the true height of the column of water which the wind sustained.

1. Let the diameters AC, EH, of the tubes, be respectively represented by cd ; and let $a=AD$, or EG, and $x=DB$, or GF: Then it is evident that the column DB, is to the column EG, as c^2x to d^2a . But these columns are equal. Therefore $c^2x = d^2a$; and consequently, $x = \frac{d^2a}{c^2}$.

2. But if at any instant of time whilst the wind was blowing, it was observed, that, when the water stood at E, the top of the tube out of which it is forced, it was depressed in the other to some given level BF, the altitude at which it would have stood in each had it immediately subsided, may be found in the following manner.—Let $b=AB$ or EF. Then it is evident that the column DB, is equal to the difference of columns EF, GF. But the difference of these columns is as $d^2b - d^2x$; and consequently $x = \frac{d^2b}{c^2 + d^2}$.

For the cases when the wind blows in at the narrow leg of the instrument: Let $AB=EF=b$, EG, or AD= a , GF=DB= x , and the diameters EH, GA, respectively = d , c , as before. Then it is evident, that the column AD, is to the column GF as c^2a to d^2x . But these columns are equal; therefore $d^2x = ac^2$; and consequently $x = \frac{ac^2}{d^2}$. It is also evident, that the column AD is equal to the difference of the columns AB, DB; but the difference of these columns is as $b^2 - c^2x$. Therefore $d^2x = b^2 - c^2x$. Whence we get $x = \frac{b^2}{a + c^2}$.

The use of the small tube of communication ab (fig. 1.), is to check the undulation of the water, so that the height of it may be read off from the scale with ease and certainty. But it is particularly designed to prevent the water from being thrown up to a much greater or less altitude, than the true height of the column which the wind is able at that time to sustain, from its receiving a sudden impulse whilst it is vibrating either in its ascent or descent. As in some cases the water in this instrument might be liable to freeze, and thus break the tubes, Dr Lind recommends a saturated solution of sea-salt to be used instead of it, which does not freeze till Fahrenheit's thermometer falls to o.

Gaieta
||
Galatia.

GAIIETA, an ancient, handsome, and strong town of Italy, in the kingdom of Naples, and in the Terra di Lavoro, with a fort, citadel, harbour, and bishop's see. It was taken by the Austrians in 1707, and by the Spaniards in 1734. It is seated at the foot of a mountain near the sea, in E. Long. 13. 37. N. Lat. 41. 30.

GAINSBOROUGH, a town of Lincolnshire in England, seated on the river Trent near the sea. It is a large well built town, with a pretty good trade, and has the title of an earldom. W. Long. 0. 40. N. Lat. 53. 26.

GALACTITES, in the history of fossils, a substance much resembling the morochthus or French chalk, in many respects; but different from it in colour. The ancients found it in the Nile, and in some rivers in Greece, and used it in medicine as an astringent, and for defluxions and ulcers of the eyes. At present it is common in Germany, Italy, and some parts of France, and is wholly overlooked, being esteemed a worse kind of morochthus. See **MOROCOTHUS**.

GALANGALS, in the materia medica. See **KÆMPFERIA**.

GALANTHUS, the **SNOW-DROP**; a genus of the monogynia order, belonging to the hexandria class of plants. There is but one species, viz. the *valis*; which is a bulbous-rooted flowery perennial, rising but a few inches in height, and adorned at top with small tripetaloid flowers of a white colour. There are three varieties, viz. the common single flowered snow-drop, the semi-double snow-drop, and the double snow-drop. They are beautiful little plants; and are much valued on account of their early appearance, often adorning the gardens in January or February, when scarce any other flower is to be seen. They frequently burst forth when the ground is covered with snow, and continue very often till the beginning of March, making a very ornamental appearance, especially when disposed in clusters towards the fronts of the borders, &c. The single kind comes first into bloom, then the semi-double, and after that the double. They will succeed any where, and multiply exceedingly by off-sets from the roots.

GALATA, a great suburb belonging to Constantinople, opposite to the seraglio, on the other side of the harbour. It is here the Greeks, Armenians, Franks, Christians, and Jews inhabit, and are allowed the exercise of their respective worships.

GALATEA, in fabulous history, a nymph and marine deity, the daughter of Nereus and Doris. She was beloved by Polyphemus, whom she despised for the shepherd *Acis*; at which that Cyclops was so enraged, that he crushed *Acis* to pieces with a rock. See *ACIS*.

GALATIA, the ancient name of a province of Asia Minor, now called *Amasia*. It was bounded on the east by Cappadocia, on the west by Bithynia, on the south by Pamphylia, and on the north by the Euxine Sea. It was reduced under the subjection of the Romans in the time of Augustus, and is now in the hands of the Turks. Here St. Paul founded a church, to which he directed that epistle which is still known by the name of the *Epistle to the Galatians*, and was

written to reclaim them from the observation of Jewish ordinances, into which they had been seduced by some false teachers.

GALAXY, in astronomy, that long, white, luminous track, which seems to encompass the heavens like a swath, scarf, or girdle: and which is easily perceivable in a clear night, especially when the moon does not appear. The Greeks call it *Γαλαξίας*, *Galaxy*, of *Γάλα, γαλακτός*, *Milk*; on account of its colour and appearance: the Latins, for the same reasons, call it *via lactea*; and we, the *milky way*. It passes between Sagittary and Gemini, and divides the sphere into two parts; it is unequally broad; and in some parts is single, in others double.

The ancient poets, and even philosophers, speak of the *Galaxy*, as the road, or way, by which the heroes went to heaven.

Aristotle makes it a kind of meteor, formed of a crowd of vapours, drawn into that part by certain large stars disposed in the region of the heavens answering hereto.

Others, finding that the *Galaxy* was seen all over the globe, that it always corresponded to the same fixed stars, and that it transcended the height of the highest planets, set aside Aristotle's opinion, and placed the *Galaxy* in the firmament, or region of the fixed stars, and concluded it to be nothing but an assemblage of an infinite number of minute stars.

Since the invention of the telescope, this opinion has been abundantly confirmed. By directing a good telescope to any part of the milky way; where, before, we only saw a confused whiteness, we now descry an innumerable multitude of little stars, so remote, that a naked eye confounds them. See **ASTRONOMY**, n° 28.

GALBANUM, in pharmacy, a gum issuing from the stem of an umbelliferous plant growing in Persia and many parts of Africa.

It is sometimes met with in the shops, in loose granules, called *drops* or *tears*; and sometimes in large masses, formed of a number of these blended together; but in these masses some accidental foulness is often mixed with the gum. The single drops usually approach to a roundish, oblong, pear-like form. Galbanum is soft like wax, and, when fresh drawn, white; but it afterwards becomes yellowish or reddish: it is of a strong smell, of an acrid and bitterish taste; it is inflammable in the manner of a resin, and soluble in water like a gum.

In medical virtue, and sensible qualities, it resembles the gum ammoniacum; but is less efficacious than it in asthma, though more efficacious in hystERIC disorders. When assa fetida is too strong, galbanum may be tried; and, if it disagrees, give ammoniacum.

A mixture of spirit of wine two parts, with one part water, dissolves all but the impurities, which are commonly in considerable quantities.

Great part of the virtue of galbanum consists in its essential oil, and is carried up in distillation either with water or with spirit, whence great care is required in purifying it. For making of plasters, and such like inferior purposes, the best method is to expose it in winter to a sharp frost, and whilst it is brittle to powder it; thus the impurities may in some measure be separated.

Galaxy,
Galbanum.

Gale.

rated in the searce: for internal uses, it is best managed by including it in a bladder, and keeping it in hot water, until it is soft enough to be strained by preasure through an hempen cloth.

Besides the essential oil yielded by distillation with water, an empyreumatic oil is obtained by distilling in a retort without mixture. This empyreumatic oil is of a fine blue colour, but changes in the air to a purple.

GALE, in the sea language, a term of various import. When the wind blows not so hard but that a ship may carry her top-sails a-trip, (that is, hoisted up to the highest) then they say it is a loom-gale. When it blows very strong, they say it is a stiff, strong, or fresh gale. When two ships are near one another at sea, and there being but little wind blowing, one of them finds more of it than the other, they say that the one ship gales away from the other.

GALE (Dr John), an eminent and learned minister among the Baptists, was born at London in 1680. He studied at Leyden, where he distinguished himself very early, and afterwards at Amsterdam, under Dr Limborch. He was chosen minister of the Baptist congregation at Barbican; where his preaching, being chiefly practical, was greatly resorted to by people of all persuasions. Four volumes of his sermons were published after his death, which happened in 1721. His *Reflections on Dr Wall's History of Infant-baptism*, is the best defence of the Baptists ever published, and the reading of that performance induced the learned Mr William Whiston and Dr Foster to become Baptists.

GALE (Theophilus), an eminent nonconformist minister, born in 1628. He was invited to Winchester in 1657; and continued a stated preacher there, until the re-establishment of the church by Charles II. when he rather chose to suffer the penalties of the act of conformity, than submit to it contrary to his conscience. He was afterwards engaged by Philip lord Wharton as tutor to his sons, whom he attended to an academy at Caen in Normandy; and when this duty was fulfilled, he became pastor over a congregation of private conventiclers in Holborn. He died in 1678; and is principally known by an elaborate work, entitled, *the Court of the Gentiles*, calculated to shew, that the Pagan philosophers derived their most sublime sentiments from the Scriptures.

GALE (Dr Thomas), a learned divine, born at Scruton in Yorkshire, in the year 1636, was educated at Cambridge, and at length became professor of the Greek language in that university. He was afterwards chosen head master of St Paul's school, London; and was employed by the city in writing those elegant inscriptions on the monument erected in memory of the conflagration in 1666. In 1676 he was collated to a prebend in the cathedral of St Paul's; and was likewise elected a fellow of the Royal Society, to which he presented a Roman urn with its ashes. About the year 1697, he gave to the new library of Trinity college, in Cambridge, a great number of Arabic manuscripts; and in 1697, was admitted dean of York. He died in that city, in 1702; and was interred in the cathedral, where a monument, with a Latin inscription, was erected to his memory. He was a learned divine, a great historian, one of the best Greek scholars of his age, and maintained a correspondence with the most

learned men abroad as well as at home. He published, 1. *Historie Poetice Antiqui Scriptores*, octavo. 2. *Opuscula Mythologica, Ethica, & Physica*, in Greek and Latin, octavo. 3. *Herodoti Historia*, folio. 4. *Historie Anglicanae Scriptores quinque*, in folio. *Historie Britannicae, Saxonicae, Anglo-Danicae, Scriptores quindecim*, in folio. 6. *Rhetores Selecti*, &c.

GALEASSE, a large low built vessel, using both sails and oars, and the biggest of all the vessels that make use of the latter. It may carry twenty guns, and has a stern capable of lodging a great number of marines. It has three masts, which are never to be lowered or taken down. It has also thirty-two benches of rowers; and to each bench six or seven slaves, who sit under cover. This vessel is at present used only by the Venetians.

GALEN (CLAUDIUS), in Latin, *Galenus*, prince of the Greek physicians, after Hippocrates, was born at Pergamus in the Lesser Asia, about the year 131. His father was possessed of a considerable fortune; was well-versed in polite literature, philosophy, astronomy, and geometry; and was also well skilled in architecture. He himself instructed his son in the first rudiments of learning, and afterwards procured him the greatest masters of the age in philosophy and eloquence. Galen having finished his studies under their care, chose physic for his profession, and chiefly studied the works of Hippocrates. Having at length exhausted all the sources of literature that were to be found at home, he resolved to travel, in order to converse with the most able physicians in all parts, intending at the same time to take every opportunity of inspecting on the spot the plants and drugs of the countries through which he passed. With this view he went to Alexandria, and staid some years in that metropolis of Egypt: from thence he travelled through Cilicia; passed through Palestine; visited the isles of Crete and Cyprus; and made two voyages to Lemnos, in order to examine the Lemnian earth, which was then esteemed an admirable medicine. With the same view he went into the Lower Tyria, in order to obtain a thorough insight into the nature of the opobalsamum, or balm of Gilead; and having completed his design, returned home by the way of Alexandria.

Galen had been four years at Pergamus, where his practice was attended with extraordinary applause, when some seditious commotions induced him to go to Rome, where he resolved to settle: but the proofs he gave of his superior skill, added to the respect shewn him by several persons of very high rank, created him so many enemies among his brethren of the faculty, that he was obliged to quit the city, after having resided there four or five years. But he had not long returned to Pergamus, when he was recalled by the emperors Aurelius and Verus. After their death, he retired to his native country; where he died, about the year 200. He wrote in Greek; and is said to have composed two hundred volumes, which were unhappily burnt in the temple of Peace. The best editions of those that remain, are, that printed at Basil, in 1538, in five volumes, and that of Venice, in 1625, in seven volumes. Galen was of a weak and delicate constitution, as he himself asserts: but he nevertheless, by his temperance and skill in physic, arrived to a great age; for it was his maxim, always to rise from table with

Galeasie,
Galen.

some degree of appetite. He is justly considered as the greatest physician of antiquity, next to Hippocrates; and he performed such surprising cures, that he was accused of magic.

GALENIC, or **GALENICAL**, in pharmacy; a manner of treating diseases, founded on the principles of Galen.

The distinction of *galenical* and *chemical*, was occasioned by a division of the practitioners of medicine into two sects, which happened on the introduction of chemistry into medicine. Then the chemists, arrogating to themselves every kind of merit and ability, stirred up an opposition to their pretensions, founded on the invariable adherence of the other party to the ancient practice. And though this division into the two sects of galenists and chemists has long ceased, yet the distinction of medicines, which resulted from it, is still retained.

Galenical medicines are those which are formed by the easier preparations of herbs, roots, &c. by infusion, decoction, &c. and by combining and multiplying ingredients; while those of chemistry draw their more intimate and remote virtues by means of fire and elaborate preparations, as calcination, digestion, fermentation, &c.

GALEON. See **GALLION**.

GALICIA, a province of Spain, bounded on the north and west by the ocean, on the south by Portugal, and on the east by Asturias and the kingdom of Leon. The air is temperate along the coast; but, in other places, it is cold and moist. It is but thin of people, and the produce is wine, flax, and citrons; here also are good pastures, copper, and lead; the forests yield wood for building of ships. St. Jago di Compostella is the capital town.

GALILEE, once a province of Judæa, now of Turkey in Asia, was bounded by mount Lebanon on the north, by the river Jordan and the sea of Galilee on the east, by the Chison on the south, and by the Mediterranean on the west. It was the scene of many of our Saviour's miracles; but the bounds of the country are not now well known, nor yet the places where many of the towns stood.

GALILEANS, a sect of the Jews. Their founder was one Judas, a native of Galilee, from which place they derived their name. Their chief, esteeming it an indignity for the Jews to pay tribute to strangers, raised up his countrymen against the edict of the emperor Augustus, which had ordered a taxation or enrolment of all the subjects of the Roman empire.

They pretended that God alone should be owned as Master and Lord, and in other respects were of the opinion of the Pharisees; but, as they judged it unlawful to pray for infidel princes, they separated themselves from the rest of the Jews, and performed their sacrifices apart.

GALILEO (Galilei), the famous mathematician and astronomer, was the son of a Florentine nobleman, and born in the year 1564. He had from his infancy a strong inclination to philosophy and the mathematics; and made prodigious progress in these sciences. In 1592, he was chosen professor of mathematics at Padua; and during his abode there he invented, it is said, the telescope; or, according to others, improv-

ved that instrument, so as to make it fit for astronomical observations: (See *ASTRONOMY*, p. 749, col. 1.) In 1611, Cosmo II. grand duke of Tuscany sent for him to Pisa, where he made him professor of mathematics, with a handsome salary; and soon after inviting him to Florence, gave him the office and title of *principal philosopher and mathematician to his highness*.

He had been but a few years at Florence, before he was convinced by sad experience, that Aristotle's doctrine, however ill-grounded, was held too sacred to be called in question. Having observed some solar spots in 1612, he printed that discovery the following year at Rome; in which, and in some other pieces, he ventured to assert the truth of the Copernican system, and brought several new arguments to confirm it. For these he was cited before the inquisition; and, after some months imprisonment, was released upon a simple promise, that he would renounce his heretical opinions, and not defend them by word or writing. But having afterwards, in 1632, published at Florence his "Dialogues of the two greatest systems of the world, the Ptolemaic and Copernican," he was again cited before the inquisition, and committed to the prison of that ecclesiastical court at Rome. In June 32d N. S. that year, the congregation convened; and in his presence pronounced sentence against him and his books, obliging him to abjure his errors in the most solemn manner; committed him to the prison of their office during pleasure; and enjoined him, as a saving penance, for three years to come and repeat once a-week the seven penitential psalms: referring to themselves, however, the power of moderating, changing, or taking away altogether or in part, the abovementioned punishment and penance. On this sentence, he was detained a prisoner till 1634; and his "Dialogues of the system of the world" were burnt at Rome.

He lived ten years after this, seven of which were employed in making still further discoveries with his telescope. But by the continual application to that instrument, added to the damage he received in his sight from the nocturnal air, his eyes grew gradually weaker, till he became totally blind in 1639. He bore this calamity with patience and resignation, worthy of a great philosopher. The loss neither broke his spirit, nor hindered the course of his studies. He supplied the defect by constant meditation; whereby he prepared a large quantity of materials, and began to dictate his own conceptions; when, by a distemper of three months continuance, wasting away by degrees, he expired at Arcetti near Florence, in January 1642, N. S. in the 78th year of his age.

Among various useful inventions of which Galileo was the author, is that of the simple pendulum, which he had made use of in his astronomical experiments. He had thoughts of applying it to clocks; but did not execute it: the glory of that invention was reserved for Vicenzio his son, who made the experiment at Venice in 1649; and M. Huygen's afterwards carried this invention to perfection.—He wrote a great number of treatises, several of which were published in a collection by Signor Mendessi, under the title of *L'opera di Galileo Galilei Lyncea*. Some of these, with others of his pieces, were translated into English and published by Thomas Salisbry, Esq; in his mathema-
ti-

tical collections, &c. in two volumes folio. A volume also of his letters to several learned men, and solutions of several problems, were printed at Bologna in quarto. Besides these, he wrote many others, which were unfortunately lost through his wife's devotion; who, solicited by her confessor, gave him leave to peruse her husband's manuscripts, of which he tore and took away as many as he said were not fit to be published.

GALL, in the animal economy. See BILE.

A great number of experiments have been made upon the gall of different animals, but few conclusions can be drawn from them with any certainty. Dr Percival, however, hath shewn, that putrid bile may be perfectly corrected and sweetened by an admixture of the vegetable acids, vinegar and juice of lemons. These, he observes, have this effect much more completely than the mineral ones: and hence, he thinks, arises the great usefulness of the vegetable acids in autumnal diseases; which are always attended with a putrescent disposition of the bile, owing to the heat of the preceding summer. On this occasion he takes notice of a common mistake among physicians, who frequently prescribe elixir of vitriol in those diseases, where vinegar or lemon juice would be much more effectual.

From this effect of acids on the gall, he also thinks, we may see why the immoderate use of acids is so pernicious to digestion. It is necessary to health that the gall should be in some degree acrid and alkalescent: but as acids have the property of rendering it perfectly mild and sweet, they must be proportionably pernicious to the due concoction and assimilation of the food; which without an acrid bile cannot be accomplished. Hence the body is deprived of its proper nourishment and support, the blood becomes vapid and watery, and a fatal cachexy unavoidably ensues. This hath been the case with many unfortunate persons, who, in order to reduce their excessive corpulency, have indulged themselves in the too free use of vinegar. From the mild state of the gall in young children, Dr Percival also thinks it is, that they are so much troubled with acidities.

GALL-Bladder. See ANATOMY, n° 358.

GALL, in natural history, denotes any protuberance or tumour produced by the puncture of insects on plants and trees of different kinds.

These galls are of various forms and sizes, and no less different with regard to their internal structure. Some have only one cavity, and others a number of small cells communicating with each other. Some of them are as hard as the wood of the tree they grow on, whilst others are soft and spongy; the first being termed *gall-nuts*, and the latter *berry-galls* or *apple-galls*.

The general history of the gall is this. An insect of the fly kind is instructed by nature to take care for the safety of her young, by lodging her eggs in a woody substance, where they will be defended from all injuries: she for this purpose wounds the leaves or tender branches of a tree; and the lacerated vessels, discharging their contents, soon form tumours about the holes thus made. The external coat of this excrescence is dried by the air; and grows into a figure which bears some resemblance to the bow of an arch, or the roundness of a kernel. This little ball receives its nutriment, growth, and vegetation, as the other parts of

the tree, by slow degrees, and is what we call the *gall-nut*. The worm that is hatched under this spacious vault, finds in the substance of the ball, which is as yet very tender, a subsistence suitable to its nature; gnaws and digests it till the time comes for its transformation to a nymph, and from that state of existence changes into a fly. After this, the insect, perceiving itself duly provided with all things requisite, disengages itself soon from its confinement, and takes its flight into the open air. The case, however, is not similar with respect to the gall-nut that grows in autumn. The cold weather frequently comes on before the worm is transformed into a fly, or before the fly can pierce through its inclosure. The nut falls with the leaves: and although you may imagine that the fly which lies within is lost, yet in reality it is not so; on the contrary, its being covered up so close, is the means of its preservation. Thus it spends the winter in a warm house, where every crack and cranny of the nut is well stopped up; and lies buried as it were under a heap of leaves, which preserves it from the injuries of the weather. This apartment, however, though so commodious a retreat in the winter, is a perfect prison in the spring. The fly, roused out of its lethargy by the first heats, breaks its way through, and ranges where it pleases. A very small aperture is sufficient, since at this time the fly is but a diminutive creature. Besides, the ringlets whereof its body is composed, dilate and become pliant in the passage.

Oak-galls put, in a very small quantity, into a solution of vitriol in water, though but a very weak one, give it a purple or violet colour: which, as it grows stronger, becomes black; and on this property depends the art of making our writing-ink, as also the arts of dying and dressing leather, and other manufactures. See INK.

GALLS are very strong astringents, and give out their astringent virtue very readily both to water and spirit. From two ounces of galls, 14 drachms of astringent extract were obtained by water, and between 12 and 13 with spirit. In medicine they are rarely used.

GALL (St), a considerable town in Switzerland, and in the Upper Thurgow, with a rich and celebrated abbey, whose abbot is a prince of the empire. This place has for some time been a republic, in alliance with the Cantons. It is not very large; but is well built, neat, populous. It contains about 10,000 inhabitants, who are chiefly employed in the linen-manufacture; and make annually, it is said, 40,000 pieces of linen, of 200 ells each; which renders it one of the richest towns in Switzerland. The inhabitants are Protestants; for which reason there are often great contentions between them and the abbey, about religious affairs. It is seated in a narrow barren valley, between two mountains, and upon two small streams. E. Long. 29. 5. N. Lat. 47. 38.

GALLAND (Aithony), a learned antiquarian, member of the Academy of Inscriptions, and professor of Arabic in the Royal College of Paris, was born of poor parents at Rollo, a village in Picardy. Having studied at the Sorbonne and other universities, he travelled into the east; where he acquired great skill in the Arabic tongue, and in the manners of the Mahometans. He wrote several works; the principal of which are, 1. An account of the death of Sultan Of-

man, and the coronation of the sultan Mustapha. 2. A collection of maxims, drawn from the works of the Orientals. 3. A treatise on the origin of coffee. 4. The Arabian nights entertainments, &c.

GALLANT, or **GALANT**, a French term adopted into our language, and signifying polite, civil, and well-bred, with a disposition to please, particularly the ladies. It also signifies brave or courageous.

GALLERY, in architecture, a covered place in a house, much longer than broad, and usually in the wings of a building; its use being chiefly to walk in.

GALLERIES, in gardening, are certain ornaments made with trees of different kinds; which are very common in all the French gardens, but are seldom introduced into the British ones, especially since the taste for clipped trees has been exploded. For those, however, who may still choose to have them, Mr Miller gives the following directions.

In order to make a gallery in a garden with porticoes and arches, a line must first be drawn of the length you design the gallery to be; which being done, it is to be planted with hornbeam, as the foundation of the gallery. The management of galleries is not difficult. They require only to be digged round about; and sheared a little when there is occasion. The chief curiosity required is in the ordering the forepart of the gallery, and in forming the arches. Each pillar of the porticoes or arches ought to be four feet distant from another, and the gallery 12 feet high and 10 feet wide, that there may be room for two or three persons to walk abreast. When the hornbeams are grown to the height of three feet, the distance of the pillars well regulated, and the ground-work of the gallery finished, the next thing to be done is to form the frontispiece; to perform which, you must stop the hornbeam between two pillars for that purpose, which forms the arch. As it grows, you must with your sheers cut off those boughs which outshoot the others. In time they will grow strong, and may be kept in form by the sheers. Portico-galleries may be covered with lime-trees.

GALLERY, in fortification, a covered walk a-cross the ditch of a town, made of strong beams, covered over with planks, and loaded with earth: sometimes it is covered with raw hides, to defend it from the artificial fires of the besieged.

GALLERY of a Mine, is a narrow passage or branch of a mine carried on under ground to a work designed to be blown up. See **MINE**.

GALLERY, in a ship, that beautiful frame, which is made in the form of a balcony, at the stern of a ship without board; into which there is a passage out of the admiral's or captain's cabin, and is for the ornament of the ship.

GALLEY, a kind of low flat-built vessel, furnished with one deck, and navigated with sails and oars, particularly in the Mediterranean. By the Greek authors under the eastern empire, this kind of vessel was called γαλῆρα and γαλῆρα; and by the Latin authors of the same time, *galeas*; whence, according to some, the modern denomination. Some say it was called *galea*, on account of a calk or helmet which it carried on its prow, as Ovid attests, *de Trifolii*. The French call it *galere*; by reason, they say, that the top of the masts is usually cut in the form of a hat, which the Italians call *galero*. Others derive both *galea*, and *galere*, from a fish by

the Greeks called γαλῆρα, or *egalea*, and by us the *sword-fish*, which this vessel resembles. Lastly, others derive the *galley*, *galea*, *galere*, *galeasse*, &c. from the Syriac and Chaldean *gaul*, and *gallin*, a man exposed on the water in a vessel of wood.

The largest sort of these vessels is employed only by the Venetians. They are commonly 162 feet long above, and 133 feet by the keel; 32 feet wide, with 23 feet length of stern-post. They are furnished with three masts, and 32 banks of oars; every bank containing two oars, and every oar being managed by six or seven slaves, who are usually chained thereto. In the fore part they have three little batteries of cannon, of which the lowest is of two 36 pounders, the second of two 24 pounders, and the uppermost of two 2 pounders: three 18 pounders are also planted on each quarter. The complement of men for one of these galleys is 1000 or 1200. They are esteemed extremely convenient for bombarding or making a descent upon an enemy's coast, as drawing but little water; and having by their oars frequently the advantage of a ship of war, in light winds or calms, by cannonading the latter near the surface of the water; by scouring her whole length with their shot, and at the same time keeping on her quarter or bow, so as to be out of the direction of her cannon.

The galleys next in size to these, which are also called *half-galleys*, are from 120 to 130 feet long, 18 feet broad, and 9 or 10 feet deep. They have two masts, which may be struck at pleasure; and are furnished with two large lateen sails, and five pieces of cannon. They have commonly 25 banks of oars, as described above. A size still less than these are called *quarter-galleys*, carrying from 12 to 16 banks of oars. There are very few galleys now besides these in the Mediterranean, which are found by experience to be of little utility except in fine weather; a circumstance which renders their service extremely precarious. They generally keep close under the shore, but sometimes venture out to sea to perform a summer cruise.

GALLEY-Worm, in zoology, an insect known by most writers under the name of *Lulus*. It is a land-insect, with a long body, composed of a great number of rings, and furnished with many feet. It is found very frequently in gardens; and, when touched, has the power of rolling itself up into a ball. This animal is very common among us, and is by some referred to the scolopendræ, but improperly: for though they agree in the great number of legs, ours is a harmless animal; whereas the scolopendræ are mischievous creatures, armed with dangerous forceps. It is supposed by Lister, that this sort of animal, common with us, would on distillation yield the same sort of animal-acid that is procured from the ant. The reason of the conjecture is, that the ant and this creature agree in emitting a sharp and pungent smell on being bruised; but these are not easily procured in sufficient plenty to make the experiment, as they are not gregarious like the ants.

GALLI, in antiquity, the priests of the goddess Cybele. They were eunuchs; and took their name from Gallus, a river in Phrygia.

When a youth was to be initiated into this order, the custom was to throw off his cloaths, to run crying aloud into the midst of the troop, and then drawing a sword to castrate himself: after this, he ran about the

street,

streets, carrying in his hands the marks of his mutilation; which he was to throw into a house, and in that house to put on a woman's dress.

GALLICAN, any thing belonging to France: thus the term *Gallican church* denotes the church of France, or the assembly of the clergy of that kingdom.

GALLICISM, a mode of speech peculiar to the French language, and contrary to the rules of grammar in other languages.

GALLINÆ, in ornithology, an order of birds. See **ZOOLOGY**.

GALLINACIOUS, an appellation given to the birds of the order of the gallinæ.

GALLING, or **EXCORIATION**, in medicine. See **EXCORIATION**.

GALLING of a *horse's back*; a disorder occasioned by heat, and the chafing or pinching of the saddle.

In order to prevent it, some take a hind's skin well garnished with hair, and sit it neatly under the pannel of the saddle, so that the hairy side may be next the horse.

When a horse's back is galled upon a journey, take out a little of the stuffing of the pannel over the swelling, and sew a piece of soft white leather on the inside of the pannel: anoint the part with salt butter, and every evening wipe it clean, rubbing it till it grow soft, anointing it again with butter, or, for want of that, with grease: wash the swelling, or hurt, every evening with cold water and soap; and strew it with salt, which should be left on till the horse be saddled in the morning.

GALLION, or **GALLEON**, in naval affairs, a sort of ships employed in the commerce of the West Indies. The Spaniards send annually two fleets; the one for Mexico, which they call the *flota*; and the other for Peru, which they call the *gallions*. See **FLOTA**.

By a general regulation made in Spain, it has been established, that there should be twelve men of war, and five tenders, annually fitted out for the armada or galleons; eight ships of six hundred tons burden each, and three tenders, one of an hundred tons, for the island Margarita, and two of eighty each, to follow the armada; for the New Spain fleet, two ships of six hundred tons each, and two tenders of eighty each; and for the Honduras fleet, two ships of five hundred tons each: and, in case no fleet happened to fail any year, three galleons and a tender should be sent to New Spain for the plate.

They are appointed to sail from Cadiz in January, that they may arrive at Porto-Bello about the middle of April; where, the fair being over, they may take aboard the plate, and be at Havannah with it about the middle of June; where they are joined by the *flota*, that they may return to Spain with the greater safety.

GALLIOT, a small galley designed only for chace, carrying but one mast and two patereroes; it can both sail and row, and has 16 or 20 oars. All the seamen on board are soldiers, and each has a musket by him on quitting his oar.

GALLIPOLI, a sea-port town of Italy, in the kingdom of Naples, and in the Terra-di-Otrante, with a bishop's see, a fort, and a harbour. It is seated on a rock, surrounded by the sea, and which is joined to

the firm land by a bridge. E. Long. 18. 10. N. Lat. 40. 20.

GALLIPOLI, a sea-port town of Turkey in Europe, in the province of Romania, seated at the mouth of the sea of Marmora, with a good harbour, and a bishop's see. It contains about 10,000 Turks, 3500 Greeks, besides a great number of Jews. The bazar, or bezelestin, the place where merchandizes are sold, is a handsome structure, with domes covered with lead. It is an open place, and has no other defence than a paltry square castle. The houses of the Greeks and Jews have doors not above three feet and a half high, to prevent the Turks riding into their houses. E. Long. 26. 59. N. Lat. 40. 30.

GALLIUM, **LADY'S BED-STRAW**; a genus of the monogynia order, belonging to the tetrandria class of plants. There are a great many species, of which the most remarkable is the verum, or yellow lady's bed-straw. It grows commonly in dry ground, and on road-sides. The flowers will coagulate boiling milk; and the best Cheshire cheese is said to be prepared with them. The French prescribe them in hysteric and epileptic cases. Boiled in alum-water, they tinge wool yellow. The roots dye a red not inferior to madder; for which purpose they are used in the island of Jura.—In the Edinburgh medical commentaries we have accounts of some violent scorbutic complaints being cured by the juice of this plant.—Sheep and goats eat the plant; horses and swine refuse it; cows are not fond of it.

GALLO, an island of the South Sea, near the sea-coast of Peru, in South America, which was the first place possessed by the Spaniards when they attempted the conquest of Peru; it is also the place where the bucaners used to come for wood and water, and to refit their vessels, when they were in these parts. W. Long. 50. 0. N. Lat. 2. 30.

GALLOIS (John), born at Paris in 1632, was an universal scholar; but chiefly noted for having been, in conjunction with M. de Sallo who formed the plan, the first publisher of the *Journal des Sçavans*. The first journal was published January 5th 1665; but these gentlemen criticized new works so rigorously, that the whole tribe of authors united and cried it down. De Sallo declined entirely after the publication of the third number: but Gallois ventured to send out a fourth, on January 4th 1666; though not without a most humble advertisement at the beginning, wherein it was declared, that the author "would not presume to criticize, but simply give an account of the books." This, with the protection of Mr Colbert, who was greatly taken with the work, gradually reconciled the public to it: and thus began literary journals, which have been continued from that time to this, under various titles, and by various writers. Gallois continued his journal to the year 1674, when more important occupations obliged him to turn it over to other hands. M. Colbert had taken him into the house to teach him Latin; and when he lost his patron in 1683, he was first made librarian to the king, and then Greek professor in the royal college. He died in 1707.

GALLON, a measure of capacity both for dry and liquid things, containing four quarts. But these quarts, and consequently the gallon itself, are different, according

Galloway
||
Gama.

cording to the quality of the thing measured: For instance, the wine-gallon contains 231 cubic inches, and holds eight pounds averdupois of pure water; the beer and ale gallon contains 281 solid inches, and holds ten pounds three ounces and a quarter averdupois of water; and the gallon for corn, meal, &c. 272½ cubic inches, and holds nine pounds thirteen ounces of pure water.

GALLOWAY, a county of Scotland, which gives the title of earl to a branch of the noble family of Stuart. It is divided into two districts; the western, called *Upper Galloway*, being the same with Wigtonshire; and the eastern, or stewartry of Kirkcubright, called *Lower Galloway*. See KIRCUDBRIGHT and WIGTONSHIRE.

GALWAY, or **GALLOWAY**, a county of Ireland, which is 82 miles in length, and 42 in breadth, bounded by the counties of Clare, Tipperary, King's County, Roscommon, and the sea. The river Shannon washes the frontiers of the east and south-east, and forms a lake several miles in length. There is another great lake, called *Corrib*, or *Carib*, which is near 20 miles long, and five broad. The county contains 15,420 houses, 136 parishes, 17 baronies, and 13 boroughs; and sends eight members to parliament. The capital town is of the same name.

GALWAY, a town of Ireland, in the county of the same name, and province of Connaught, of which it is the capital. It is surrounded with strong walls, has large straight streets, and the houses are generally well built with stone. It has a good trade into foreign parts, on account of its harbour, which is defended by a fort. It is seated on the bay of Galway on the western ocean, 30 miles west of Athlone, and 100 west of Dublin. W. Long. 9. 10. N. Lat. 53. 12.

GALLOWES, an instrument of punishment, whereon persons convicted capitally of felony, &c. are executed by hanging.

Among our ancestors it was called *furca*, "fork;" a name by which it is still denominated abroad, particularly in France and Italy. In this latter country, the reason of the name still subsists; the gallows being a real fork drove into the ground, across the legs whereof is laid a beam, to which the rope is tied. See **FURCA**.

GALLUS (Cornelius), an ancient Roman poet, born at Forum Julium, now called *Frejus*, in France. He was a particular favourite with Augustus Cæsar, who made him governor of Egypt: but his maladministration there occasioned his banishment, and the loss of his estate; for grief of which he put an end to his own life. He wrote four books of love-elegies; and Virgil has complimented him in many places.

GALLUS, or *Cock*, in ornithology. See **PHASIANUS**.

GALLY, in printing, a frame into which the compositor empties the lines out of his composing-stick, and in which he ties up the page when it is completed.

The gally is formed of an oblong square board, with a ledge on three sides, and a groove to admit a false bottom called a *gally-slice*.

GAMA (Valco de), a Portuguese admiral, celebrated for his discovery of the East Indies by the Cape of Good Hope, was born at Synes; and, in 1497,

was sent to the Indies by king Emanuel: he returned in 1502, and sailed thither again with 13 vessels richly laden. He was made viceroy of the Indies by king John III.; and died at Cochín, on the 24th of December 1525. Don Stephen and Don Christopher de Gama, his sons, were also viceroys of the Indies, and celebrated in history.

GAMBIA, a large river of Negroeland in Africa, generally supposed to be a branch of the Niger. See **NILE**, **NIGER**, and **SENEGAL**.

GAMBOGE, is a concentered vegetable juice, the produce of two trees, both called by the Indians *caracapulli*, and is partly of a gummy and partly of a resinous nature. It is brought to us either in form of orbicular masses, or of cylindrical rolls of various sizes; and is of a dense, compact, and firm texture, and of a beautiful yellow. It is chiefly brought to us from Cambaja, in the East Indies, called also *Cambodja*, and *Cambogia*; and from thence it has obtained its names of *cambadium*, *cambogium*, and *gambogium*.

As a pigment, it makes a beautiful yellow, which is much used by the painters. Dr Lewis says, that it makes a beautiful and durable citron-yellow stain upon marble, whether rubbed in substance on the hot stone, or applied, as dragon's-blood sometimes is, in form of a spirituous tincture. When it is applied on cold marble, the stone is afterwards to be heated, to make the colour penetrate.

Gamboge is commonly called a *gum*, but improperly. It appears to be wholly resinous or sulphureous; since spirit of wine dissolves it almost entirely, and water, though it separates its parts and keeps them suspended, yet does not dissolve them at all, nor is by any means a solvent for it. It is also very inflammable, and melts with a very gentle heat. If mixed with an equal quantity of salt of tartar, it readily dissolves in common water by a few hours digestion. This solution, if kept over the fire, soon becomes a sort of smooth glue or jelly. This is sometimes done with a view to correct the deleterious qualities of gamboge taken inwardly, in which case it occasions violent vomitings and purgings. But the most effectual method of correcting this and other resinous purgatives, is by triturating them well with three or four times their weight of white sugar, by which means they are rendered fusible in water, and incapable of adhering to the villous coats of the intestines.

GAME, in general, signifies any diversion, or sport, that is performed with regularity, and restrained to certain rules. See **GAMING**.

Games are usually distinguished into those of exercise and address, and those of hazard. To the first belong chess, tennis, billiards, &c. and to the latter those performed with cards or dice, as back-gammon, ombre, picquet, whist, &c. See **BACK-GAMMON**, &c.

GAMES, in antiquity, were public diversions, exhibited on solemn occasions. Such, among the Greeks, were the Olympic, Pythian, Isthmian, Nemean, &c. games; and, among the Romans, the Apollinarian, Circensian, Capitoline, &c. games. See **OLYMPIC**, **PYTHIAN**, &c.

GAME, in law, signifies birds, or prey, taken or killed by fowling or hunting.

The property of such animals *sera natura* as are known under the denomination of *game*, with the right of

Gambia
||
Game.

Game.

Game.

of pursuing, taking, and destroying them, is vested in the king alone; and from him derived to such of his subjects as have received the grants of a chase, a park, or a free warren.

Black.
Comment.

By the law of nature, indeed, every man, from the prince to the peasant, has an equal right of pursuing, and taking to his own use, all such creatures as are *feræ naturæ*, and therefore the property of nobody, but liable to be seized by the first occupant. But it follows from the very end and constitution of society, that this natural right, as well as many others belonging to man as an individual, may be restrained by positive laws enacted for reasons of state, or for the supposed benefit of the community. This restriction may be either with respect to the *place* in which this right may, or may not, be exercised; with respect to the *animals* that are the subjects of this right; or with respect to the *persons* allowed or forbidden to exercise it. And, in consequence of this authority, we find that the municipal laws of many nations have exerted such power of restraint; have in general forbidden the entering on another man's grounds, for any cause, without the owner's leave; have extended their protection to such particular animals as are usually the objects of pursuit; and have invested the prerogative of hunting and taking such animals, in the sovereign of the state only, and such as he shall authorize. Many reasons have concurred for making these constitutions: as, 1. For the encouragement of agriculture and improvement of lands, by giving every man an exclusive dominion over his own soil. 2. For the preservation of the several species of these animals, which would soon be extirpated by a general liberty. 3. For prevention of idleness and dissipation in husbandmen, artificers, and others of lower rank; which would be the unavoidable consequence of universal licence. 4. For prevention of popular insurrections and resistance to the government, by disarming the bulk of the people: which last is a reason oftener meant than avowed, by the makers of forest or game laws. Nor, certainly, in these prohibitions is there any *natural* injustice, as some have weakly enough supposed: since, as Puffendorf observes, the law does not hereby take from any man his present property, or what was already his own; but barely abridges him of one means of acquiring a future property, that of occupancy; which indeed the law of nature would allow him, but of which the laws of society have in most instances very justly and reasonably deprived him.

Yet, however defensible these provisions in general may be, on the footing of reason, or justice, or civil policy, we must, notwithstanding, acknowledge, that, in their present shape, they owe their immediate original to slavery. It is not till after the irruption of the northern nations into the Roman empire, that we read of any other prohibitions, than that natural one of not sporting on any private grounds without the owner's leave.

With regard to the rise and original of our present civil prohibitions, it will be found, that all forest and game laws were introduced into Europe at the same time, and by the same policy, as gave birth to the feudal system; when those swarms of barbarians issued from their northern hive, and laid the foundation of most of the present kingdoms of Europe, on the ruins

VOL. V.

of the western empire. For when a conquering general came to settle the *economy* of a vanquished country, and to partit out among his soldiers or feudatories, who were to render him military service for such donations; it behoved him, in order to secure his new acquisitions, to keep the *russici* or natives of the country, and all who were not his military tenants, in as low a condition as possible, and especially to prohibit them the use of arms. Nothing could do this more effectually than a prohibition of hunting and sporting: and therefore it was the policy of the conqueror to reserve this right to himself, and such on whom he should bestow it; which were only his capital feudatories, or greater barons. And, accordingly, we find, in the feudal constitutions, one and the same law prohibiting the *russici* in general from carrying arms, and also proscribing the use of nets, snares, or other engines for destroying the game. This exclusive privilege well suited the martial genius of the conquering troops, who delighted in a sport which in its pursuit and slaughter bore some resemblance to war. *Vita omnis* (says Cæsar, speaking of the ancient Germans) in *venationibus atque in studiis rei militaris consistit*. And Tacitus in like manner observes, that *quoties bella non inuent, multum venatibus, plus per otium transigunt*. And indeed, like some of their modern successors, they had no other amusement to entertain their vacant hours; they despising all arts as effeminate, and having no other learning, than was couched in such rude ditties as were sung at the solemn carousals which succeeded these ancient huntings. And it is remarkable, that, in those nations where the feudal policy remains the most uncorrupted, the forest or game laws continue in their highest rigour. In France, all game is properly the king's; and in some parts of Germany it is death for a peasant to be found hunting in the woods of the nobility.

With us in Britain, also, hunting has ever been esteemed a most princely diversion and exercise. The whole island was replenished with all sorts of game in the times of the Britons; who lived in a wild and pastoral manner, without inclosing or improving their grounds; and derived much of their subsistence from the chase, which they all enjoyed in common. But, when husbandry took place under the Saxon government, and lands began to be cultivated, improved, and enclosed, the beasts naturally fled into the woody and desert tracts; which were called the *forests*, and, having never been disposed of in the first distribution of lands, were therefore held to belong to the crown. These were filled with great plenty of game, which our royal sportsmen reserved for their own diversion, on pain of a pecuniary forfeiture for such as interfered with their sovereign. But every freeholder had the full liberty of sporting upon his own territories, provided he abtained from the king's forests.

However, upon the Norman conquest, a new doctrine took place; and the right of pursuing and taking all beasts of chase or *venary*, and such other animals as were accounted *game*, was then held to belong to the king, or to such only as were authorized under him. And this, as well upon the principles of the feudal law, that the king is the ultimate proprietor of all the lands in the kingdom, they being all held of him as the chief lord, or lord paramount of the fee;

18 G

and

and that therefore he has the right of the universal soil, to enter thereon, and to chase and take such creatures at his pleasure: so also upon another maxim of the common law, that these animals *sunt bona vacantia*, and, having no other owner, belong to the king by his prerogative. As therefore the former reason was held to vest in the king a right to pursue and take them any where; the latter was supposed to give the king, and such as he should authorize, a *sole and exclusive* right.

This right, thus newly vested in the crown, was exerted with the utmost rigour, at and after the time of the Norman establishment; not only in the ancient forests, but in the new ones which the conqueror made, by laying together vast tracts of country, depopulated for that purpose, and reserved solely for the king's royal diversion; in which were exercised the most horrid tyrannies and oppressions, under colour of forest-law, for the sake of preserving the beasts of chase; to kill any of which, within the limits of the forest, was as penal as the death of a man. And, in pursuance of the same principle, king John laid a total interdict upon the winged as well as the fourfooted creation: *capturam avium per totam Angliam interdixit* *. The cruel and insupportable hardships, which these forest-laws created to the subject, occasioned our ancestors to be as zealous for their reformation, as for the relaxation of the feudal rigours and the other exactions introduced by the Norman family; and accordingly we find the immunities of *carta foresta* as warmly contended for, and extorted from the king with as much difficulty, as those of *magna carta* itself. By this charter, confirmed in parliament †, many forests were disafforested, or stripped of their oppressive privileges, and regulations were made in the regimen of such as remained; particularly killing the king's deer was made no longer a capital offence, but only punished by a fine, imprisonment, or abjuration of the realm. And by a variety of subsequent statutes, together with the long acquiescence of the crown without exerting the forest-laws, this prerogative is now become no longer a grievance to the subject.

But, as the king reserved to himself the forests for his own exclusive diversion, so he granted out from time to time other tracts of lands to his subjects under the names of *chases* or *parks*; or gave them licence to make such in their own grounds; which indeed are smaller forests in the hands of a subject, but not governed by the forest-laws; and by the common law no person is at liberty to take or kill any beasts of chase, but such as hath an ancient chase or park; unless they be also beasts of pvey.

As to all inferior species of game, called *beasts and fowls of warren*; the liberty of taking or killing them is another franchise or royalty, derived likewise from the crown, and called *free-warren*; a word which signifies preservation or custody: as the exclusive liberty of taking and killing fish in a public stream or river is called a *free fishery*; of which, however, no new franchise can at present be granted, by the express provision of *magna carta*, c. 16. The principal intention of granting a man these franchises or liberties was in order to protect the game, by giving him a sole and exclusive power of killing it himself, provided he prevented other persons. And no man, but he who has

a chase or free warren, by grant from the crown, or prescription, which supposes one, can justify hunting or sporting upon another man's soil; nor indeed, in thorough strictness of common law, either hunting or sporting at all.

However novel this doctrine may seem, it is a regular consequence from what has been before delivered; that the sole right of taking and destroying game belongs exclusively to the king. This appears, as well from the historical deduction here made, as because he may grant to his subjects an exclusive right of taking them; which he could not do, unless such a right was first inherent in himself. And hence it will follow, that no person whatever, but he who has such derivative right from the crown, is by common law entitled to take or kill any beasts of chase, or other game whatsoever. It is true, that, by the acquiescence of the crown, the frequent grants of free-warren in ancient times, and the introduction of new penalties of late by certain statutes for preserving the game, this exclusive prerogative of the king is little known or considered; every man, that is exempted from these modern penalties, looking upon himself as at liberty to do what he pleases with the game: whereas the contrary is strictly true, that no man, however well qualified he may vulgarly be esteemed, has a right to encroach on the royal prerogative by the killing of game, unless he can shew a particular grant of free-warren; or a prescription, which presumes a grant; or some authority under an act of parliament. As for the latter, there are but two instances wherein an express permission to kill game was ever given by statute; the one by 1 Jac. I. c. 27. altered by 7 Jac. I. c. 11. and virtually repealed by 22 and 23 Car. II. c. 25. which gave authority, so long as they remained in force, to the owners of free-warren, to lords of manors, and to all freeholders having 40*l.* *per annum* in lands of inheritance, or 80*l.* for life or lives, or 400*l.* personal estate, (and their servants), to take partridges and pheasants upon their own, or their master's, free-warren, inheritance, or freehold: the other by 5 Ann. c. 14. which empowers lords and ladies of manors to appoint gamekeepers, to kill game for the use of such lord or lady; which with some alteration still subsists; and plainly supposes such power not to have been in them before. The truth of the matter is, that these game-laws do indeed *qualify* nobody, except in the instance of a gamekeeper, to kill game: but only to save the trouble and formal process of an action by the person injured, who perhaps too might remit the offence, these statutes inflict *additional* penalties, to be recovered either in a regular or summary way, by any of the king's subjects, from certain persons of inferior rank who may be found offending in this particular. But it does not follow that persons, excused from these additional penalties, are therefore *authorized* to kill game. The circumstance of having 100*l.* *per annum*, and the rest, are not properly qualifications, but exemptions. And these persons, so exempted from the penalties of the game-statutes, are not only liable to actions of trespass by the owners of the land; but also, if they kill game within the limits of any royal franchise, they are liable to the actions of such who may have the right of chase or free-warren therein.

Upon the whole, it appears, that the king, by his pre-

* M. Paris, 303.

† 9 Hen. III.

Game
||
Gaming.

* See these
articles.

prerogative, and such persons as have, under his authority, the royal franchise of CHACE, PARK, or FREE-WARREN *, are the only persons who may acquire any property, however fugitive and transitory, in these animals *feræ nature*, while living; which is said to be vested in them *propter privilegium*. And it must also be observed, that such persons as may thus lawfully hunt, fish, or fowl, *ratione privilegii*, have only a qualified property in these animals: it not being absolute or permanent, but lasting only so long as the creatures remain within the limits of such respective franchise or liberty, and ceasing the instant they voluntarily pass out of it. It is held indeed, that if a man starts any game within his own grounds, and follows it into another's, and kills it there, the property remains in himself. And this is grounded on reason and natural justice: for the property consists in the possession; which possession commences by the finding it in his own liberty, and is continued by the immediate pursuit. And so, if a stranger starts game in one man's chace or free-warren, and hunts it into another liberty, the property continues in the owner of the chace or warren; this property arising from privilege, and not being changed by the act of a mere stranger. Or if a man starts game on another's private grounds, and kills it there, the property belongs to him in whose ground it was killed, because it was also started there; this property arising *ratione soli*. Whereas if, after being started there, it is killed in the grounds of a third person, the property belongs not to the owner of the first ground, because the property is local; nor yet to the owner of the second, because it was not started in his soil; but it vests in the person who started and killed it, tho' guilty of a trespass against both the owners. See the article *Game-Laws*.

GAME-COCK, a fighting cock, or one kept for sport; a barbarous practice, which is a disgrace to any civilized nation. See *Cock-Fighting*.

GAMELIA, in Grecian antiquity, a nuptial feast, or rather sacrifice, held in the ancient Greek families on the day before a marriage; thus called, from a custom they had of shaving themselves on this occasion, and presenting their hair to some deity to whom they had particular obligations.

GAMELION, in the ancient chronology, was the eighth month of the Athenian year, containing 29 days, and answering to the latter part of our January and beginning of February. It was thus called, as being, in the opinion of the Athenians, the most proper season of the year for marriage.

GAMING, the art of playing or practising any game, particularly those of hazard; as cards, dice, tables, &c.

Gaming has at all times been looked upon as a thing of pernicious consequence to the commonwealth; and is therefore severely prohibited by law. It is considered as a practice generally intended to supply, or retrieve, the expences occasioned by *LUXURY*: it being a kind of tacit confession, that the company engaged therein do, in general, exceed the bounds of their respective fortunes; and therefore they cast lots to determine upon whom the ruin shall at present fall, that the rest may be saved a little longer. But, taken in any light, it is an offence of the most alarming nature; tending, by necessary consequence, to promote public

idleness, theft, and debauchery, among those of a lower class; and, among persons of a superior rank, it hath frequently been attended with the sudden ruin and desolation of ancient and opulent families, an abandoned prostitution of every principle of honour and virtue, and too often hath ended in self-murder. To restrain this pernicious vice among the inferior sort of people, the statute 33 Hen. VIII. c. 9. was made; which prohibits, to all but gentlemen, the games of tennis, tables, cards, dice, bowls, and other unlawful diversions there specified, unless in the time of Christmas, under pecuniary pains and imprisonment. And the same laws, and also the statute 30 Geo. II. c. 24. inflict pecuniary penalties, as well upon the master of any public house wherein servants are permitted to game, as upon the servants themselves who are found to be gaming there. But this is not the principal ground of modern complaint: it is the gaming in high life, that demands the attention of the magistrate; a passion to which every valuable consideration is made a sacrifice, and which we seem to have inherited from our ancestors the ancient Germans; whom Tacitus describes to have been bewitched with the spirit of play to a most exorbitant degree. "They addict themselves, (says he,) to dice (which is wonderful) when sober, and as a serious employment; with such a mad desire of winning or losing, that, when strip of every thing else, they will stake at last their liberty, and their very selves. The loser goes into a voluntary slavery; and, though younger and stronger than his antagonist, suffers himself to be bound and sold. And this perseverance in so bad a cause they call the point of honour: *ea est in re prava perniciosa, ipsi fidem vocant*." One would almost be tempted to think Tacitus was describing a modern Englishman. When men are thus intoxicated with so frantic a spirit, laws will be of little avail: because the same false sense of honour, that prompts a man to sacrifice himself, will deter him from appealing to the magistrate. Yet it is proper that laws should be, and be known publicly, that gentlemen may consider what penalties they wilfully incur, and what a confidence they repose in sharpers; who, if successful in play, are certain to be paid with honour, or, if unsuccessful, have it in their power to be still greater gainers by informing. For, by stat. 16 Car. II. c. 7. if any person by playing or betting shall lose more than 100 l. at one time, he shall not be compellable to pay the same; and the winner shall forfeit treble the value, one moiety to the king, the other to the informer. The statute 9 Ann. c. 14. enacts, that all bonds and other securities, given for money won at play, or money lent at the time to play withal, shall be utterly void; that all mortgages and incumbrances of lands, made upon the same consideration, shall be and enure to the heir of the mortgagor; that, if any person at one time loses 10 l. at play, he may sue the winner, and recover it back by action of debt at law; and, in case the loser does not, any other person may sue the winner for treble the sum so lost; and the plaintiff in either case may examine the defendant himself upon oath: and that in any of these suits no privilege of parliament shall be allowed. The statute farther enacts, that if any person cheats at play, and at one time wins more than 10 l. or any valuable thing, he may be indicted thereupon, and shall forfeit five times the value, shall

Gaming.

be deemed infamous, and suffer such corporal punishment as in case of wilful perjury. By several statutes of the reign of king George II. all private lotteries by tickets, cards, or dice, (and particularly the games of faro, ballet, ace of hearts, hazard, passage, rolly polly, and all other games with dice, except back-gammon) are prohibited under a penalty of 200*l*. for him that shall erect such lotteries, and 50*l*. a-time for the players. Public lotteries, unless by authority of parliament, and all manner of ingenious devices, under the denomination of *sales* or otherwise, which in the end are equivalent to lotteries, were before prohibited by a great variety of statutes under heavy pecuniary penalties. But particular descriptions will ever be lame and deficient, unless all games of mere chance are at once prohibited; the invention of sharpers being swifter than the punishment of the law, which only hunts them from one device to another. The stat. 13 Geo. II. c. 19. to prevent the multiplicity of horse-races, another fund of gaming, directs, that no plates or matches under 50*l*. value shall be run, upon penalty of 200*l*. to be paid by the owner of each horse running, and 100*l*. by such as advertise the plate. By statute 18 Geo. II. c. 34. the statute 9 Ann. is farther enforced, and some deficiencies supplied: the forfeitures of that act may now be recovered in a court of equity; and, moreover, if any man be convicted, upon information or indictment, of winning or losing at any sitting 10*l*. or 20*l*. within 24 hours, he shall forfeit five times the sum. Thus careful has the legislature been to prevent this destructive vice: which may shew that our laws against gaming are not so deficient, as ourselves and our magistrates in putting those laws in execution.

Chance, or Hazard, in GAMING. Hazard, or chance, is a matter of mathematical consideration, because it admits of more and less. Gamblers either set out upon an equality of chance, or are supposed to do so. This equality may be altered in the course of the game, by the greater good-fortune or address of one of the gamblers, whereby he comes to have a better chance, so that his share in the stakes is proportionably better than at first. This more and less runs thro' all the ratios between equality and infinite difference, or from an infinitely little difference till it come to an infinite great one, whereby the game is determined. The whole game, therefore, with regard to the issue of it, is a chance of the proportion the two shares bear to each other.

The probability of an event is greater or less, according to the number of chances by which it may happen, compared with the number of all the chances by which it may either happen or fail.

M. de Moivre, in a treatise de *Mensura Sortis*, has computed the variety of chances in several cases that occur in gaming, the laws of which may be understood by what follows.

Suppose *p* the number of cases in which an event may happen, and *q* the number of cases wherein it may not happen, both sides have the degree of probability, which is to each other as *p* to *q*.

If two gamblers, A and B, engage on this footing, that, if the cases *p* happen, A shall win; but if *q* happen, B shall win, and the stake be *a*; the chance of

A will be $\frac{p \cdot a}{q + p}$, and that of B $\frac{q \cdot a}{p + q}$; consequently, if

they sell the expectancies, they should have that for them respectively.

If A and B play with a single die, on this condition, that, if A throw two or more aces at eight throws, he shall win; otherwise B shall win; What is the ratio of their chances? Since there is but one case wherein an ace may turn up, and five wherein it may not, let $a=1$, and $b=5$. And, again, since there are eight throws of the die, let $n=8$; and, you will have $a^n + b^n - b^n - nab^n - 1$, to $b^n + nab^n - 1$: that is, the chance of A will be to that of B, as 663991 to 1015625, or nearly as 2 to 3.

A and B are engaged at single quoits; and, after playing some time, A wants 4 of being up, and B 6; but B is so much the better gambler, that his chance against A upon a single throw would be as 3 to 2; What is the ratio of their chances? Since A wants 4, and B 6, the game will be ended at nine throws; therefore, raise $a=b$ to the ninth power, and it will be $a^9 + 9 a^8 b + 36 a^7 b^2 + 84 a^6 b^3 + 126 a^5 b^4 + 126 a^4 b^5$, to $84 a^3 b^6 + 36 a^2 b^7 + 6 a b^8 + b^9$: call *a* 3, and *b* 2, and you will have the ratio of chances in numbers, viz. 1759077 to 194048.

A and B play at single quoits, and A is the best gambler, so that he can give B 2 in 3: What is the ratio of their chances at a single throw? Suppose the chances as 2 to 1, and raise $x+1$ to its cube, which will be $x^3 + 3x^2 + 3x + 1$. Now since A could give B 2 out of 3, A might undertake to win three throws running; and, consequently, the chances in this case will be as x^3 to $3x^2 + 3x + 1$. Hence $x^3 = 3x^2 + 3x + 1$; or $2x^3 = 3x^2 + 3x + 1$. And, therefore, $x^{\frac{3}{2}} = x + 1$; and, consequently, $x = \sqrt[3]{\frac{1}{2x-1}}$. The chances,

therefore, are $\sqrt[3]{\frac{1}{2x-1}}$ and 1, respectively.

Again, suppose I have two wagers depending, in the first of which I have 3 to 2 the best of the lay, and in the second 7 to 4; What is the probability I win both wagers?

1. The probability of winning the first is $\frac{3}{5}$, that is the number of chances I have to win, divided by the number of all the chances: the probability of winning the second is $\frac{7}{11}$: therefore, multiplying these two fractions together, the product will be $\frac{3}{5} \cdot \frac{7}{11}$, which is the probability of winning both wagers. Now, this fraction being subtracted from 1, the remainder is $\frac{14}{55}$, which is the probability I do not win both wagers: therefore the odds against me are 34 to 21.

2. If I would know what the probability is of winning the first, and losing the second, I argue thus: the probability of winning the first is $\frac{3}{5}$, the probability of losing the second is $\frac{4}{11}$: therefore multiplying $\frac{3}{5}$ by $\frac{4}{11}$, the product $\frac{12}{55}$ will be the probability of my winning the first, and losing the second; which being subtracted from 1, there will remain $\frac{43}{55}$, which is the probability I do not win the first, and at the same time lose the second.

3. If I would know what the probability is of winning the second, and at the same time losing the first, I say thus: The probability of winning the second is $\frac{7}{11}$; the probability of losing the first is $\frac{2}{5}$: therefore, multiplying these two fractions together, the product $\frac{14}{55}$ is the probability I win the second, and also lose the first.

Gaming.

Gaming.

4. If I would know what the probability is of losing both wagers, I say, the probability of losing the first is $\frac{1}{2}$, and the probability of losing the second $\frac{1}{2}$; therefore the probability of losing them both is $\frac{1}{4}$; which, being subtracted from 1, there remains $\frac{3}{4}$; therefore, the odds of losing both wagers is 47 to 8.

This way of reasoning is applicable to the happening or failing of any events that may fall under consideration. Thus if I would know what the probability is of missing an ace four times together with a die, this I consider as the failing of four different events. Now the probability of missing the first is $\frac{5}{6}$, the second is also $\frac{5}{6}$, the third $\frac{5}{6}$, and the fourth $\frac{5}{6}$; therefore the probability of missing it four times together is $\frac{5}{6} \times \frac{5}{6} \times \frac{5}{6} \times \frac{5}{6} = \frac{625}{1296}$; which being subtracted from 1, there will remain $\frac{671}{1296}$ for the probability of throwing it once or oftener in four times: therefore the odds of throwing an ace in four times, is 671 to 625.

But if the flinging of an ace was undertaken in three times, the probability of missing it three times would be $\frac{5}{6} \times \frac{5}{6} \times \frac{5}{6} = \frac{125}{216}$; which being subtracted from 1, there will remain $\frac{91}{216}$ for the probability of throwing it once or oftener in three times: therefore the odds against throwing it in three times are 125 to 91. Again, suppose we would know the probability of throwing an ace once in four times, and no more: since the probability of throwing it the first time is $\frac{1}{4}$, and of missing it the other three times, is $\frac{3}{4} \times \frac{3}{4} \times \frac{3}{4}$, it follows, that the probability of throwing it the first time, and missing it the other three successive times, is $\frac{1}{4} \times \frac{3}{4} \times \frac{3}{4} \times \frac{3}{4} = \frac{27}{256}$; but because it is possible to hit it every throw as well as the first, it follows, that the probability of throwing it once in four throws, and missing it the other three, is $\frac{4 \times 125}{1296} = \frac{500}{1296}$; which being subtracted from 1, there will remain $\frac{796}{1296}$ for the probability of throwing it once, and no more, in four times. Therefore, if one undertake to throw an ace once, and no more, in four times, he has 500 to 796 the worst of the lay, or 5 to 8 very near.

Suppose two events are such, that one of them has twice as many chances to come up as the other; what is the probability, that the event, which has the greater number of chances to come up, does not happen twice before the other happens once, which is the case of flinging 7 with two dice before 4 once? Since the number of chances is as 2 to 1, the probability of the first happening before the second is $\frac{2}{3}$, the probability of its happening twice before it is but $\frac{2}{3} \times \frac{2}{3}$ or $\frac{4}{9}$; therefore it is 5 to 4 seven does not come up twice before four once.

But, if it were demanded, what must be the proportion of the facilities of the coming up of two events, to make that which has the most chances come up twice, before the other comes up once? The answer is, 12 to 5 very nearly: whence it follows, that the probability of throwing the first before the second is $\frac{12}{17}$, and the probability of throwing it twice is $\frac{12}{17} \times \frac{12}{17}$, or $\frac{144}{289}$; therefore the probability of not doing it is $\frac{145}{289}$; therefore the odds against it are as 145 to 144, which comes very near an equality.

Suppose there is a heap of thirteen cards of one colour, and another heap of thirteen cards of another colour; What is the probability, that, taking one card

at a venture out of each heap, I shall take out the two aces?

The probability of taking the ace out of the first heap is $\frac{1}{13}$, the probability of taking the ace out of the second heap is $\frac{1}{13}$; therefore the probability of taking out both aces is $\frac{1}{13} \times \frac{1}{13} = \frac{1}{169}$, which being subtracted from 1, there will remain $\frac{168}{169}$; therefore the odds against me are 168 to 1.

In cases where the events depend on one another, the manner of arguing is somewhat altered. Thus, suppose that out of one single heap of thirteen cards of one colour I should undertake to take out first the ace; and, secondly, the two: though the probability of taking out the ace be $\frac{1}{13}$, and the probability of taking out the two be likewise $\frac{1}{13}$; yet, the ace being supposed as taken out already, there will remain only twelve cards in the heap, which will make the probability of taking out the two to be $\frac{2}{12}$; therefore the probability of taking out the ace, and then the two, will be $\frac{1}{13} \times \frac{2}{12}$.

In this last question the two events have a dependence on each other, which consists in this, that one of the events being supposed as having happened, the probability of the other's happening is thereby altered. But the case is not so in the two heaps of cards.

If the events in question be n in number, and be such as have the same number a of chances by which they may happen, and likewise the same number b of chances by which they may fail, raise $a+b$ to the power n . And if A and B play together, on condition that if either one or more of the events in question happen, A shall win, and B lose, the probability of

A's winning will be $\frac{a+b^n - b^n}{a+b^n}$; and that of B's

winning will be $\frac{b^n}{a+b^n}$; for when $a+b$ is actually raised to the power n , the only term in which a does not occur is the last b^n : therefore all the terms but the last are favourable to A.

Thus if $n=3$, raising $a+b$ to the cube $a^3+3a^2b+3ab^2+b^3$, all the terms but b^3 will be favourable to A; and therefore the probability of A's winning will be $\frac{a^3+3a^2b+3ab^2}{a^3+3a^2b+3ab^2+b^3}$, or $\frac{a^3+b^3}{a+b}$; and the proba-

bility of B's winning will be $\frac{b^3}{a+b^3}$. But if A and B

play on condition, that if either two or more of the events in question happen, A shall win; but in case one only happen, or none, B shall win; the probability of A's winning will be $\frac{a+b^n - n \cdot a^{n-1}b - b^n}{a+b^n}$; for

the only two terms in which a does not occur, are the two last, viz. $n \cdot a^{n-1}b$ and b^n .

GAMMONING, among seamen, denotes several turns of rope taken round the bowsprit, and reeved through holes in knees of the head, for the greater security of the bowsprit.

GAMMUT, in music, a scale whereon we learn to sound the musical notes, *ut, re, mi, fa, sol, la*, in their several orders and dispositions. See MUSIC.

GANDER, in ornithology, the male of the goose-kind; one of which, it is said, will serve five geese.* * See ANAT.

GANG-

Gaming

Gander.

Gang
Gaol.

GANG-WAY, is the several passages or ways from one part of the ship to the other; and whatsoever is laid in any of those passages, is said to lie in the gaugeway.

GANGANELLI. See **CLEMENT XIV.**

GANGES, a large and celebrated river of India. It has its source in the mountains which border on Little Thibet, in 96 degrees of longitude, and 35. 45. of latitude. It crosses several kingdoms, running from north to south; and falls into the bay of Bengal, by several mouths. The waters are lowest in April and May, and highest before the end of September. It overflows yearly like the Nile; and renders the kingdom of Bengal as fruitful as that of the Delta in Egypt. The people in these parts hold the water of this river in high veneration; and it is visited annually by a prodigious number of pilgrims from all parts of India. The English have several settlements on this river, which will be taken notice of in their proper places. The greatest happiness that many of the Indians has for, is to die in this river.

GANGLION, in anatomy, denotes a knot frequently found in the course of the nerves, and which is not morbid; for wherever any nerve sends out a branch, or receives one from another, or where two nerves join together, there is generally a ganglion or plexus, as may be seen at the beginning of all the nerves of the medulla spinalis, and in many other places of the body.

GANGLION, in surgery, a hard tubercle, generally moveable, in the external or internal part of the carpus, upon the tendons or ligaments in that part; usually without any pain to the patient.

GANGRENE, a very great and dangerous degree of inflammation, wherein the parts affected begin to corrupt, and put on a state of putrefaction. See (the *Index* subjoined to) **MEDICINE**, and **SURGERY**.

GANNET, or **SOLAND GOSSE**, in ornithology. See **PELICANUS**.

GANTLET, or **GAUNTLET**, a large kind of glove made of iron, and the fingers covered with small plates. It was formerly worn by the cavaliers, when armed at all points.

GANYMEDE, in the ancient mythology, son of a king of Troy, was the most beautiful boy in the world. Jupiter was charmed with him, and made him his cup-bearer in the room of Hebe. Some say that he caused him to be carried away by an eagle, and others affirm he was himself the ravisher under the form of that bird. He defied this youth; and, to comfort his father, made a present to him of some of those very swift horses that the gods rode upon.

GAOL (*Gaola*, Fr. *Geole*, i. e. *Caveola*, "a cage for birds"), is used metaphorically for a prison. It is a strong place or house for keeping of debtors, &c. and wherein a man is restrained of his liberty to answer an offence done against the laws; and every county hath two gaols, one for debtors, which may be any house where the sheriff pleases; the other for the peace and matters of the crown, which is the county gaol.

If a gaol be out of repair, or insufficient, &c. justices of peace, in their quarter sessions, may contract with workmen for the rebuilding or repairing it; and by their warrant order the sum agreed on for that

purpose, to be levied on the several hundreds, and other divisions in the county by a just rate, 11 & 12 Will. III. c. 19. See **PRISON**.

GAOL-DELIVERY. The administration of justice being originally in the crown, in former times our kings in person rode through the realm once in seven years, to judge of and determine crimes and offences; afterwards *justices in eyre* were appointed; and since, *justices of assize and gaol-delivery*, &c. A commission of gaol-delivery, is a patent in nature of a letter from the king to certain persons, appointing them his justices, or two or three of them, and authorizing them to deliver his *gaol*, at such a place, of the prisoners in it: for which purpose it commands them to meet at such a place, at the time they themselves shall appoint; and informs them, that, for the same purpose, the king hath commanded his sheriff of the same county to bring all the prisoners of the gaol, and their attachments, before them at the day appointed.

The justices of gaol-delivery are empowered by the common law to proceed upon indictments of felony, trespass, &c. and to order to execution or reprieve: they may likewise discharge such prisoners, as on their trials are acquitted, and those against whom, on proclamation being made, no evidence has appeared: they have authority to try offenders for treason, and to punish many particular offences, by statute 2 *Hawk.* 24. 2 *Hale's hist. Placit. Cor.* 35.

GAOLER, the keeper of a gaol or prison. Sheriffs are to make such gaolers for whom they will be answerable: but if there be any default in the gaoler, an action lies against him for an escape, &c. yet the sheriff is most usually charged; 2 *Inst.* 592. Where a gaoler kills a prisoner by hard usage, it is felony; 3 *Inst.* 52. No fee shall be taken by gaolers, but what is allowed by law, and settled by the judges, who may determine petitions against their extortions, &c. 2 *Geo.* II. c. 22.

GAONS, a certain order of Jewish doctors, who appeared in the East, after the closing of the talmud. The word *Gaons* signifies Excellent, Sublime; as in the divinity-schools we formerly had Irrefragable, Sublime, Resolute, Angelic, and Subtle doctors. The Gaons succeeded the Sazarans, or Opinars, about the beginning of the sixth century. Chanan Meisichtia was the head, and first of the excellents. He reformed the academy of Pandebita, which had been shut up for 30 years.

GAR-FISH, *HORN-fish*, or *Sea-needle*. See **ESOX**.

GARAMOND (Claude), a very ingenious letter-founder, was born at Paris; where he began, in the year 1510, to found his printing types free from all the remains of the Gothic, or (as it is generally called) the *black letter*, and brought them to such perfection, that he had the glory of surpassing all who went before him, and of being scarcely ever excelled by his successors in that useful art. His types were prodigiously multiplied; both by the great number of matrices he struck, and the types formed in resemblance of his in all parts of Europe. Thus in Italy, Germany, England, and Holland, the booksellers, by way of recommending their books, distinguished the type by his name; and in particular the small Roman was, by way of excellence, known among the printers of these nations by the name of *Garamond's small Roman*.

Gaol
Garamond

By the special command of king Francis I. he founded three sizes of Greek types for the use of Robert Stephens, who with them printed all his beautiful editions of the New Testament, and other Greek authors. He died at Paris, in 1561.

GARASSE (Francis), a remarkable jesuitical writer, the first author of that irreconcilable enmity that fill subsists between the Jesuits and Janfenists in the church of Rome, was born at Angoulême in 1585; and entered the Jesuits college in 1600. As he had a quick imagination, a strong voice, and a peculiar turn to wit, he became a popular preacher in the chief cities of France; but not content with this honour, he distinguished himself still more by his writings, which were bold, licentious, and produced much controversy. The most considerable in its consequences, was intitled *La somme theologique des veritez capitales de la religion Chretienne*; which was first attacked by the abbot of St Cyran, who, observing in it a prodigious number of falsifications of the Scriptures and of the fathers, beside many heretical and impious opinions, conceived the honour of the church required him to undertake a refutation. Accordingly he published a full answer to it; while Garasse's book was also under examination of the doctors of the Sorbonne, by whom it was afterwards condemned. Garasse replied to St Cyran; but the two parties of Jesuits and Janfenists, of whom these were respectively the champions, grew to an implacable animosity against each other, that is not even now likely to subside. The Jesuits were forced to remove their brother to a distance from Paris; where, probably weary of his inactive obscurity, when the plague raged at Poitiers in 1631, he begged leave of his superior to attend the sick, in which charitable office he caught the disorder, and died.

GARBE, in heraldry, a sheaf of any kind of grain, borne in several coats of arms, and said to represent summer, as a bunch of grapes does autumn.

GARBLE, a word used to signify the action of separating the dross and dunt from spice, drugs, &c. *Garbling* is the cleansing and purifying the good from the bad; and may come from the Italian *garbo*, i. e. finery or neatness: and hence, probably, we say, when we see a man in a neat habit, that he is in handsome *garb*.

GARCILASSO (de la Vega), a celebrated Spanish poet, born of a noble family at Toledo, in 1500. He was educated near the emperor Charles V. who had a particular regard for him, and whom he attended in all his military expeditions; acquiring as much renown by his courage as by his poetry. In Provence he commanded a battalion; and was killed in the 36th year of his age, by a stone thrown at his head by a country-man from a turret. He had strong natural talents for poetry; and not only extended the bounds, but introduced new beauties, into that of the Spanish language.—We must not confound this poet with another person of the same name, a native of Cusco, who wrote in Spanish, a History of Florida, and of Peru and the Incas.

GARDANT, or GWARDANT, in heraldry, denotes any beast full-faced, and looking right forward.

GARDEN, a plot of ground, cultivated, and properly ornamented with a variety of plants, flowers,

fruits, &c. See GARDENING.

Gardens are usually distinguished into flower-garden, fruit-garden, and kitchen-garden: the first of which, being designed for pleasure and ornament, is to be placed in the most conspicuous part, that is, next to the back-front of the house; and the two latter, being designed for use, should be placed less in sight. But though the fruit and kitchen-gardens are here mentioned as two distinct gardens, yet they are now usually in one; and that with good reason, since they both require a good soil and exposure, and equally require to be placed out of the view of the house. See KITCHEN-Garden.

In the choice of a place proper for a garden, the most essential points to be considered are the situation, the soil, the exposure, water, and prospect.

1st, As to the situation, it ought to be such a one as is wholesome, and in a place neither too high nor too low; for if a garden be too high, it will be exposed to the winds, which are very prejudicial to trees; and if it be too low, the dampness, the vermin, and the venomous creatures that breed in ponds and marshy places, add much to their insalubrity. The most happy situation is on the side of a hill, especially if the slope be easy, and in a manner imperceptible; if a good deal of level ground be near the house; and if it abounds with springs of water: for, being sheltered from the fury of the winds, and the violent heat of the sun, a temperate air will be there enjoyed; and the water that descends from the top of the hill, either from springs or rain, will not only supply fountains, canals, and cascades for ornament, but, when it has performed its office, will water the adjacent valleys, and, if it be not suffered to stagnate, will render them fertile and wholesome. Indeed, if the declivity of the hill be too steep, and the water be too abundant, a garden on the side of it may frequently suffer, by having trees torn up by torrents and floods; and by the tumbling down of the earth above, the walls may be demolished, and the walks spoiled. It cannot, however, be denied, that the situation on a plain or flat has several advantages which the higher situation has not: for floods and rain commit no damage; there is a continued prospect of champaigns, intersected by rivers, ponds, and brooks, meadows, and hills covered with woods or buildings; besides, the level surface is less tiresome to walk on, and less chargeable than that on the side of an hill, since terrace-walks and steps are not there necessary: but the greatest disadvantage of flat gardens, is the want of those extensive prospects which rising grounds afford.

2^{dly}, A good earth or soil is next to be considered; for it is scarce possible to make a fine garden in a bad soil. There are indeed ways to meliorate ground, but they are very expensive; and sometimes, when the expence has been bellowed of laying good earth three feet deep over the whole surface, a whole garden has been ruined, when the roots of the trees have come to reach the natural bottom. To judge of the quality of the soil, observe whether there be any heath, thistles, or such-like weeds growing spontaneously in it; for they are certain signs that the ground is poor. Or if there be large trees growing thereabouts, observe, whether they grow crooked, ill-shaped, and grubby, and whether they are of a faded green, and full of

moths, or infested with vermin; if this be the case, the place is to be rejected: but, on the contrary, if it be covered with good grafs fit for pasture, you may then be encouraged to try the depth of the soil. To know this, dig holes in several places, six feet wide, and four deep; and if you find three feet of good earth, it will do very well; but less than two will not be sufficient. The quality of good ground is, neither to be stony, nor too hard to work; neither too dry, too moist, nor too sandy and light; nor too strong and clayey, which is the worst of all for gardens.

3dly, The next requisite is water; the want of which is one of the greatest inconveniences that can attend a garden, and will bring a certain mortality upon whatever is planted in it, especially in the greater droughts that often happen in a hot and dry situation in summer; besides its usefulness in fine gardens for making fountains, canals, cascades, &c. which are the greatest ornaments of a garden.

4thly, The last thing to be considered, is the prospect of a fine country; and though this is not so absolutely necessary as water, yet it is one of the most agreeable beauties of a fine garden: besides, if a garden be planted in a low place that has no kind of prospect, it will not only be disagreeable, but unwholesome.

In the laying out and planting of gardens the beauties of nature should always be studied; for the nearer a garden approaches to nature, the longer it will please. The area of a handsome garden, may take up thirty or forty acres, but not more; and the following rules should be observed in the disposition of it. There ought always to be a descent of at least three steps from the house to the garden; this will render the house more dry and wholesome, and the prospect on entering the garden more extensive. The first thing that ought to present itself to view, should be an open lawn of grafs, which ought to be considerably broader than the front of the building; and if the depth be one half more than the width, it will have a better effect: if on the sides of the lawn there are trees planted irregularly, by way of open groves, the regularity of the lawn will be broken, and the whole rendered more like nature. For the convenience of walking in damp weather, this lawn should be surrounded with a gravel walk, on the outside of which should be borders three or four feet wide, for flowers; and from the back of these the prospect will be agreeably terminated by a slope of ever-green shrubs; which, however, should never be suffered to exclude agreeable prospects, or the view of handsome buildings. These walks may lead through the different plantations, gently winding about in an easy natural manner; which

will be more agreeable than either those long straight walks, too frequently seen in gardens, or those serpentine windings, that are twisted about into so many short turns, as to render it difficult to walk in them: and as no garden can be pleasing where there is a want of shade and shelter, these walks should lead as soon as possible into plantations, where persons may walk in private, and be sheltered from the wind. Where the borders of the gardens are fenced with walls or pales, they should be concealed with plantations of flowering shrubs, intermixed with laurels and other ever-greens; which will have a good effect, and at the same time conceal the fences, which are disagreeable when left naked and exposed to the sight. Groves are the most agreeable parts of a garden, so that there cannot be too many of them; only that they must not be too near the house, nor be suffered to block up agreeable prospects. To accompany parterres, groves opened in compartments, quincunxes, and arbour-work with fountains, &c. are very agreeable. Some groves of ever-greens should be planted in proper places, and some squares of trees of this kind may also be planted among the other wood.

Narrow rivulets, if they have a constant stream, and are judiciously led about a garden, have a better effect than many of the large stagnating ponds or canals, so frequently made in large gardens. When wildernesses are intended, they should not be cut into stars and other ridiculous figures, nor formed into mazes or labyrinths, which in a great design appear trifling. Buildings, statues, and vases, appear very beautiful; but they should never be placed too near each other: magnificent fountains are also very ornamental; but they ought never to be introduced, except there be water to keep them constantly running. The same may also be observed of cascades and other falls of water.

In short, the several parts of a garden should be diversified; but in places where the eye takes in the whole at once, the two sides should be always the same. In the business of designs, the aim should be always at what is natural, great, and noble. The general disposition of a garden, and of its parts, ought to be accommodated to the different situations of the ground, to humour its inequalities, to proportion the number and sorts of trees and shrubs to each part, and to shut out from the view of the garden no objects that may become ornamental. And before a garden is planned out, it ought ever to be considered, what it will be when the trees have had 20 years growth.—But for a more extended view of this subject, see the next article.

G A R D E N I N G;

THE art of cultivating or planning gardens.—Gardening, in the perfection to which it has been lately brought in Britain, is entitled to a place of considerable rank among the liberal arts. It is as superior to landscape-painting, as a reality to a representation: it is an exertion of fancy; a subject for taste; and being released now from the restraints of regularity, and enlarged beyond the purposes of domestic convenience, the most beautiful, the most simple, the most noble

scenes of nature, are all within its province. For it is no longer confined to the spots from which it takes its name; but regulates also the disposition and embellishments of a park, a farm, or a riding: and the business of a gardener is to select and apply whatever is great, elegant, or characteristic, in any of them; to discover and to shew all the advantages of the place upon which he is employed; to supply its defects, to correct its faults, and to improve its beauties. For all these operations,

Subjects
and materials
of gardening.

perations, the objects of nature are still his only materials. His first inquiry, therefore, must be into the means by which those effects are attained in nature,

which he is to produce; and into those properties in the objects of nature, which should determine him in the choice and arrangement of them.

PART I. OF THE CONSTITUENT PARTS OF THE SCENES OF NATURE.

NATURE, always simple, employs but four materials in the composition of her scenes; *ground, wood, water, and rocks*. The cultivation of nature has introduced a fifth species, the *buildings* requisite for the accommodation of men. Each of these again admits of varieties in figure, dimensions, colour, and situation. Every landscape is composed of these parts only; every beauty in a landscape depends on the application of their several varieties.

SECT. I. Of Ground.

THE shape of ground must be either a *convex*, a *concave*, or a *plane*; in terms less technical called a *swell*, a *hollow*, and a *level*. By combinations of these are formed all the irregularities of which ground is capable; and the beauty of it depends on the degrees and the proportions in which they are blended.

Both the convex and the concave are forms in themselves of more variety, and may therefore be admitted to a greater extent than a plane. But levels are not totally inadmissible. The preference unjustly shewn to them in the old gardens; where they prevailed almost in exclusion of every other form, has raised a prejudice against them. It is frequently reckoned an excellence in a piece of made ground, that every the least part of it is uneven; but then it wants one of the three great varieties of ground, which may sometimes be intermixed with the other two. A gentle concave declivity falls and spreads easily on a flat; the channels between several swells degenerate into mere gutters, if some breadth be not given to the bottoms by flattening them; and in many other instances, small portions of an inclined or horizontal plane may be introduced into an irregular composition. Care only must be taken to keep them down as subordinate parts, and not to suffer them to become principal.

There are, however, occasions on which a plane may be principal: a hanging level often produces effects not otherwise attainable. A large dead flat, indeed, raises no other idea than of safety: the eye finds no amusement, no repose on such a level: it is fatigued, unless timely relieved by an adequate termination; and the strength of that termination will compensate for its distance. A very wide plain, at the foot of a mountain, is less tedious than one of much less compass surrounded only by hillocks. A flat therefore of considerable extent may be hazarded in a garden, provided the boundaries also be considerable in proportion; and if, in addition to their importance, they become still more interesting by their beauty, then the facility and distinctness with which they are seen over a flat make the whole an agreeable composition. The greatness and the beauty of the boundary are not, however, alone sufficient; the form of it is of still more consequence. A continued range of the noblest wood, or the finest hill, would not cure the insipidity of a flat: a less important, a less pleasing

boundary, would be more effectual, if it traced a more varied outline; if it advanced sometimes boldly forward, sometimes retired into deep recesses; broke all the sides into parts, and marked even the plain itself with irregularity.

At Moor Park, on the back-front of the house, is a lawn of about thirty acres, absolutely flat; with falls below it on one hand, and heights above it on the other. The rising ground is divided into three great parts, each so distinct and so different, as to have the effect of several hills. That nearest to the house shelves gently under an open grove of noble trees which hang on the declivity, and advance beyond it on the plain. The next is a large hill pressing forward, and covered with wood from the top to the bottom. The third is a bold steep, with a thicket falling down the steepest part, which makes it appear still more precipitate: but the rest of the slope is bare; only the brow is crowned with wood, and towards the bottom is a little groupe of trees. These heights, thus finely characterised in themselves, are further distinguished by their appendages. The small, compact groupe near the foot, but still on the descent, of the farther hill, is contrasted by a large straggling clump, some way out upon the lawn, before the middle eminence. Between this and the first hill, under two or three trees which cross the opening, is seen to great advantage a winding glade, which rises beyond them, and marks the separation. This deep recess, the different distances to which the hills advance, the contrast in their forms, and their accompaniments, cast the plain on this side into a most beautiful figure. The other side and the end were originally the flat edge of a descent; a harsh, offensive termination: but it is now broken by several hillocks, not diminutive in size, and considerable by the fine clumps which distinguish them. They recede one beyond another, and the outline waves agreeably amongst them. They do more than conceal the sharpness of the edge; they convert a deformity into a beauty, and greatly contribute to the embellishment of this most lovely scene: a scene, however, in which the flat is principal; and yet a more varied, a more beautiful landscape, can hardly be desired in a garden.

A plain is not, however, in itself interesting; and the least deviation from the uniformity of its surface changes its nature: as long as the flat remains, it depends on the objects around for all its variety, and all its beauty. But convex and concave forms are generally pleasing, and the number of degrees and combinations into which they may be cast is infinite: those forms only in each which are perfectly regular must be avoided. A semicircle can never be tolerable: small portions of large circles blended together, or lines gently curved which are not parts of any circle, a hollow sinking but little below a level, a swell very much flattened at the top, are commonly the most agreeable figures.

³ Description of a lawn at Moor Park, (the seat of Sir J. Laur. Dundas, near Rickmansworth in Hertfordshire.)

² Of a level.

⁴ Of convex or concave shapes of ground.

Section I.
GROUND.

In ground which lies beautifully, the concave will generally prevail; within the same compass it shews more surface than a swell. All the sides of the latter, are not visible at the same time, except in a few particular situations: but it is only in a few particular situations, that any part of a hollow is concealed; earth seems to have been accumulated to raise the one, and taken away to sink the other. The concave, therefore, appears the lighter, and for the most part it is the more elegant shape: even the slopes of a swell can hardly be brought down, unless broken now and then into hollows, to take off from the heaviness of the mass. There are, however, situations where the convex form should be preferred: a hollow just below the brow of a hill reduces it to a narrow ridge, which has a poor meagre appearance; and an abrupt fall will never seem to join with a concave form immediately above it: a sharp edge divides them; and to connect them, that edge must be rounded, or at least flattened; which is, in fact, to interpose a convex or a level.

5
Of the connection between the parts in ground.

Is made ground, the connection is, perhaps, the principal consideration. A swell which wants it is but a heap, a hollow but a hole, and both appear artificial: the one seems placed upon a surface to which it does not belong; the other, dug into it. On the great scale of nature, indeed, either may be so considerable in itself, as to make its relation to any other almost a matter of indifference: but, on the smaller scale of a garden, if the parts are disjointed, the effect of the whole is lost; and the union of all is not more than sufficient to preserve an idea of greatness and importance, to spots which must be varied, and cannot be spacious. Little inequalities are besides in nature usually well blended together: all lines of separation have, in a course of time, been filled up; and therefore, when in made ground they are left open, that ground appears artificial.

Even where artifice is avowed, a breach in the connection offends the eye. The use of a fosse is merely to provide a fence, without obstructing the view. To blend the garden with the country is no part of the idea: the cattle, the objects, the culture, without the sunk fence, are discordant to all within, and keep up the division. A fosse may open the most polished lawn to a corn-field, a road, or a common, though they mark the very point of separation. It may be made on purpose to shew objects which cannot, or ought not to be in the garden; as a church, or a mill, a neighbouring gentleman's seat, a town, or a village; and yet no consciousness of the existence can reconcile us to the sight of this division. The most obvious disguise is to keep the hither above the further bank all the way; so that the latter may not be seen at a competent distance. But this alone is not always sufficient: for a division appears, if an uniformly continued line, however faint, be discernible; that line, therefore, must be broken. Low but extended hillocks may sometimes interrupt it; or the shape on one side may be continued, across the sunk fence, on the other; as when the ground sinks in the field, by beginning the declivity in the garden. Trees too without, connected with those within, and seeming part of a clump or a grove there, will frequently obliterate every trace of an interruption. By such, or other means, the line may be, and should be,

hid or disguised; not for the purpose of deception, (when all is done, we are seldom deceived), but to preserve the continued surface entire.

If, where no union is intended, a line of separation is disagreeable, it must be disgusting when it breaks the connection between the several parts of the same piece of ground. That connection depends on the *junction of each part to those about it, and on the relation of every part to the whole*. To complete the former, such shapes should be contiguous as most readily unite; and the actual division between them should be anxiously concealed. If a swell descends upon a level; if a hollow sinks from it, the level is an abrupt termination, and a little rim marks it distinctly. To cover that rim, a short sweep at the foot of the swell, a small rotundity at the entrance of the hollow, must be interposed. In every instance, when ground changes its direction, there is a point where the change is effected, and that point should never appear; some other shapes, uniting easily with both extremes, must be thrown in to conceal it. But there must be no uniformity even in these connections: if the same sweep be carried all round the bottom of a swell, the same rotundity all round the top of a hollow, though the junction be perfect, yet the art by which it is made is apparent, and art must never appear. The manner of concealing the separation should itself be disguised: and different degrees of cavity and rotundity; different shapes and dimensions to the little parts thus distinguished by degrees; and those parts breaking, in one place more in another less, into the principal forms which are to be united; produce that variety with which all nature abounds, and without which ground cannot be natural.

THE relation of all the parts to the whole, when clearly marked, facilitates their junction with each other: for the common bond of union is then perceived, before there has been time to examine the subordinate connections; and if these should be deficient in some niceties, the defect is lost in the general impression. But any part which is at variance with the rest, is not barely a blemish in itself: it spreads disorder as far as its influence extends; and the confusion is in proportion as the other parts are more or less adapted to point out *any particular direction*, or to mark any *peculiar character* in the ground.

If, in ground all descending one way, a piece is twisted another, the general fall is obstructed by it; but if all the parts incline in the same direction, it is hardly credible how small a declivity will seem to be considerable. An appearance even of steepness may be given to a very gentle descent, by raising hillocks upon it, which shall lean to the point, whither all the rest are tending: for the eye measures from the top of the highest, to the bottom of the lowest ground; and when the relation of the parts is well preserved, such an effect from one is transfused over the whole.

But they should not, therefore, all lie exactly in the same direction: some may seem to point to it directly, others to incline very much, others but little, some partially, some entirely. If the direction be strongly marked on a few principal parts, great liberties may be taken with the others, provided none of them are turned the contrary way. The general idea must, however, be preserved, clear even of a doubt. A hillock which only intercepts the sight, if it does not contribute

6
Of the relation of the parts to the whole.

tribute to the principal effect, is at the best an unnecessary excess; and even an interruption in the general tendency, tho' it hide nothing, is a blemish. On a descent, any hollow, any fall, which has not an outlet to lower ground, is a hole: the eye skips over it, instead of being continued along it; it is a gap in the composition.

There may indeed be occasions, when we should rather wish to check, than to promote, the general tendency. Ground may proceed too hastily towards its point; and we have equal power to retard, or to accelerate, the fall. We can slacken the precipitancy of a steep, by breaking it into parts, some of which shall incline less, than the whole before inclined, to the principal direction; and by turning them quite away, we may even change the course of the descent. These powers are of use in the larger scenes, where the several great parts often lie in several directions; and if they are thereby too strongly contrasted, or led towards points too widely asunder, every art should be exerted to bring them nearer together, to assimilate, and to connect them. As scenes increase in extent, they become more impatient of controul: they are not only less manageable, but ought to be less restrained; they require more variety and contrast. But still the same principles are applicable to the least, and to the greatest, tho' not with equal severity: neither ought to be rent to pieces; and tho' a small neglect, which would distract the one, may not disturb the other, yet a total disregard of all the principles of union is alike productive of confusion in both.

THE *style* also of every part, must be accommodated to the character of the whole. For every piece of ground is distinguished by certain properties: it is either tame or bold, gentle or rude, continued or broken; and if any variety, inconsistent with those properties, be obtruded, it has no other effect than to weaken one idea without raising another. The insipidity of a flat is not taken away by a few scattered hillocks; a continuation of uneven ground can alone give the idea of inequality. A large, deep, abrupt break, among easy swells and falls, seems at the best but a piece left unfinished, and which ought to have been softened: it is not more natural, because it is more rude; nature forms both the one and the other, but seldom mixes them together. On the other hand, a small fine polished form, in the midst of rough, misshapen ground, though more elegant than all about it, is generally no better than a patch, itself disgraced, and disfiguring the scene. A thousand instances might be adduced to shew, that the prevailing idea ought to pervade every part, so far at least indispensably as to exclude whatever distracts it, and as much further as possible to accommodate the character of the ground to that of the scene it belongs to.

On the same principle, the *proportion* of the parts may often be adjusted. For though their size must be very much governed by the extent of the place, and a feature which would fill up a small spot may be lost in a large one; though there are forms of a particular cast, which appear to advantage only within certain dimensions, and ought not therefore to be applied where they have not room enough, or where they must occupy more space than becomes them; yet, independent of these considerations, a character of greatness

belongs to some scenes, which is not measured by their extent, but raised by other properties, sometimes only by the proportional largeness of their parts. On the contrary, where elegance characterises the spot, the parts should not only be small, but diversified besides with subordinate inequalities, and little delicate touches with every where scattered about them. Striking effects, forcible impressions, whatever seems to require effort, disturb the enjoyment of a scene intended to amuse and to please.

In other instances, similar considerations will determine rather the *number* than the proportion of the parts. A place may be distinguished by its simplicity, which many divisions would destroy; another spot, without any pretensions to elegance, may be remarkable for an appearance of richness: a multiplicity of objects will give that appearance, and a number of parts in the ground will contribute to the profusion. A scene of gaiety is improved by the same means; the objects and the parts may differ in style, but they must be numerous in both. Sameness is dull: the purest simplicity can at the most render a place composed of large parts placid; the sublimest ideas only make it striking: it is always grave; to enliven it, numbers are wanting.

BUT ground is seldom beautiful or natural without *variety*, or even without contrast; and the precautions which have been given, extend no farther than to prevent variety from degenerating into inconsistency, and contrast into contradiction. Within the extremes, nature supplies an inexhaustible fund; and variety thus limited, so far from destroying, improves the general effect: Each distinguished part makes a separate impression; and all bearing the same stamp, all concurring to the same end, every one is an additional support to the prevailing idea: that is multiplied, it is extended, it appears in different shapes, it is shewn in several lights, and the variety illustrates the relation.

BUT variety wants not this recommendation; it is always desirable where it can be properly introduced; and an accurate observer will see in every form several circumstances by which it is distinguished from every other. If the scene be mild and quiet, he will place together those which do not differ widely; and he will gradually depart from the similitude. In ruder scenes, the succession will be less regular, and the transitions more sudden. The character of the place must determine the degree of difference between forms which are contiguous. Besides distinctions in the shapes of ground, differences in their *situations* and their *dimensions* are sources of variety. The position will alter the effect, though the figure be the same; and for particular effects, a change only in the distance may be striking. If that be considerable, a succession of similar shapes sometimes occasions a fine perspective; but the diminution will be less marked, that is, the effect will be less sensible, if the forms are not nearly alike: we take more notice of one difference, when there is no other. Sometimes a very disagreeable effect, produced by too close a resemblance of shapes, may be remedied only by an alteration in the size. If a steep descends in a succession of abrupt falls, nearly equal, they have the appearance of steps, and are neither pleasing nor wild; but if they are made to differ in height and length, the objection is removed: and at all times a difference

Section I.
GROUND.

Section I.
GROUND.

9
Of the lines
traced by
the several
parts in
ground.

difference in the dimensions will be found to have a greater effect than in speculation we should be inclined to ascribe to it, and will often disguise a similarity of figure.

It also contributes, perhaps more than any other circumstance, to the perfection of those *lines*, which the eye traces along the parts of a piece of ground, when it glances over several together. No variety of form compensates for the want of it. An undulating line composed of parts all elegant in themselves, all judiciously contralted, and happily united, but equal one to another, is far from the line of beauty. A long straight line has no variety at all; and a little deviation into a curve, if there be still a continued uniformity, is but a trifling amendment. Though ground all falling the same requires every attention to its general tendency, yet the eye must not dart down the whole length immediately in one direction, but should be insensibly conducted towards the principal point with some circuit and delay. The channels between hillocks ought never to run in straight, nor even regularly curved lines; but winding gently among them, and constantly varying in form and in dimensions, should gradually find their way. The beauty of a large hill, especially when seen from below, is frequently impaired by the even continuation of its brow. An attempt to break it by little knoles is seldom successful; they seem separate independent hillocks artificially put on. The intended effect may indeed be produced by a large knole descending in some places lower than in others, and rooted at several points into the hill. The same end may be attained by carrying some channel or hollow on the side upwards, till it cut the continued line; or by bringing the brow forward in one place, and throwing it back in another; or by forming a secondary ridge a little way down the side, and casting the ground above it into a different though not opposite direction to the general descent. Any of these expedients will at least draw the attention off from the defect. But if the break were to divide the line into equal parts, another uniformity would be added, without removing the former: for regularity always suggests a suspicion of artifice; and artifice detected, no longer deceives. Our imaginations would indolently join the broken parts, and the idea of the continued line would be restored.

10
Of contrast.

WHATEVER break be chosen, the position of it must be oblique to the line which is to be broken. A rectangular division produces sameness; there is no *contrast* between the forms it divides: but if it be oblique, while it diminishes the part on one side, it enlarges that on the other. Parallel lines are liable to the same objection as those at right angles: though each by itself be the perfect line of beauty; yet if they correspond, they form a shape between them, whose sides want contrast. On the same principle, forms will sometimes be introduced, less for their intrinsic than their occasional merit in contrasting happily with those about them: each sets off the other; and together they are a more agreeable composition than if they had been more beautiful, but at the same time more similar.

One reason why tame scenes are seldom interesting, is, that though they often admit of many varieties, they allow of few, and those only faint, contrasts. We may be pleased by the number of the former, but we

can be struck only by the force of the latter. These ought to abound in the larger and bolder scenes of a garden, especially in such as are formed by an assemblage of many distinct and considerable parts thrown together: as when several rising grounds appear one beyond another; a fine swell seen above a sloping sweep which runs before it, has a beautiful effect, which a nearer resemblance would destroy: and (except in particular instances) a close similarity between lines which either cross, or face, or rise behind one another, makes a poor, uniform, disagreeable composition.

THE application of any of the foregoing observations to the still greater scenes of nature, would carry us at present too far; nor could it well be made, before the other constituent parts of those scenes, wood, water, rocks, and buildings, have been taken into consideration. The rules which have been given, are chiefly applicable to ground which may be managed by a spade; and even there they are only general, not universal: few of them are without exception; very few, which, on particular occasions, may not be dispensed with. Many of the above remarks are, however, so far of use in scenes the farthest from our reach, as they may assist in directing our choice of those parts which are in our power to shew, or to conceal, though not to alter. But in converting them to this purpose, a caution, which has more than once been alluded to, must always be had in remembrance; never to suffer general considerations to interfere with *extraordinary great effects*, which rise superior to all regulations, and perhaps owe part of their force to their deviation from them. Singularity causes at least surprise, and surprise is allied to astonishment. These effects are not, however, attached merely to objects of enormous size; they frequently are produced by a greatness of style and character, within such an extent as ordinary labour may modify, and the compass of a garden include. The caution therefore may not be useless within these narrow bounds: but nature proceeds still further, beyond the utmost verge to which art can follow; and, in scenes licentiously wild, not content with contrast, forces even contradictions to unite. The grotesque discordant shapes which are often there confusedly jumbled together, might sufficiently justify the remark. But the caprice does not stop here: to mix with such shapes a form perfectly regular, is still more extravagant; and yet the effect is sometimes so wonderful, that we cannot with the extravagance corrected. It is not unusual to see a conical hill standing out from a long, irregular, mountainous ridge, and greatly improving the view: but at Ilam such a hill is thrown into the midst of the rudest scene, and almost fills up an abyss, sunk among huge, bare, misshapen hills, whose unwieldy parts, and uncouth forms, cut by the tapering lines of the cone, appear more savage from the opposition: and the effect would evidently be stronger, were the figure more complete; for it does not rise quite to a point, and the want of perfect regularity seems a blemish. Whether such a mixture of contraries would for a length of time be engaging, can be known only to those who are habituated to the spot. It certainly at first sight rivets the attention. But the conical hill is the most striking object. In such a situation it appears more strange, more fantastic, than

11
Of extraordinary effects.

12
Description of a hill at Ilam, near Athbourne in Derbyshire.

the

the rude shapes which are heaped about it: and together they suit the character of the place, where nature seems to have delighted to bring distances together; where two rivers, which are ingulphed many miles asunder, issue from their subterraneous passages, the one often muddy when the other is clear, within a few paces of each other: but they appear only to lose themselves again; for they immediately unite their streams, just in time to fall together into another current, which also runs through the garden. Such whimsical wonders, however, lose their effect, when represented in a picture, or mimicked in ground artificially laid. They there want that vastness which constitutes their force; that reality which ascertains the caprice. As accidents they may surprize; but they are not objects of choice.

To determine the choice to its proper objects is the purpose of the foregoing observations. Some of the principles upon which they are founded will be applicable also, and perhaps without further explanation, to the other constituent parts of the scenes of nature: they will there be often more obvious than in ground. But this is not a place for the comparison; the subject now is ground only. It is not, however, foreign to that subject to observe, that the effects which have been recommended, may sometimes be produced by wood alone, without any alteration in the ground itself: a tedious continued line may by such means be broken. It is usual for this purpose to place several little clumps along a brow; but if they are small and numerous, the artifice is weak and apparent: an equal number of trees collected into one or two large masses, and dividing the line into very unequal parts, is less suspicious, and obliterates the idea of sameness with more certainty. Where several similar lines are seen together, if one be planted, and the other bare, they become contrails to each other. A hollow in certain situations, has been mentioned as a disagreeable interruption in a continued surface: but, filled with wood, the heads of the trees supply the vacancy; the irregularity is preserved; even the inequalities of the depth are in some measure shewn; and a continuation of surface is provided. Raising ground may, on the other hand, be in appearance raised still higher, by covering it with wood, of humble growth towards the bottom, and gradually taller as it ascends. An additional mark of the inclination of falling ground may also be obtained, by placing a few trees in the same direction, which will strongly point out the way; whereas plantations athwart a descent, bolster up the ground, and check the fall: but obliquely crossing it, they will often divert the general tendency; the ground will in some measure assume their direction, and they will make a variety, not a contradiction. Hedges, or continued plantations, carried over uneven ground, render the irregularity more conspicuous, and frequently mark little inequalities, which would otherwise escape observation; or if a line of trees run close upon the edge of an abrupt fall, they give it depth and importance. By such means a view may be improved; by similar means, in more confined spots, very material purposes may be answered.

SECT. II. Of Wood.

In the above instances the ground is the principal consideration: but previous to any inquiry into the greater

effects of wood, when it is itself an object, an examination of the *characteristic differences* of trees and shrubs is necessary. We do not mean botanical distinctions; we mean apparent, not essential varieties; and these must be obvious and considerable, to merit regard in the disposition of the objects they distinguish.

Trees and shrubs are of different *shapes, greens, and growths*.

The varieties in their shapes may be reduced to the following heads.

Some thick with branches and foliage have almost an appearance of *solidity*; as the beech and the elm, the lilac and syringa. Others thin of boughs and of leaves seem *light and airy*; as the ash and the arbutus, the common arbutus vitæ and the tamarisk.

There is a mean *betwixt the two extremes*, very distinguishable from both; as in the bladder-nut, and the alden-leaved maple.

They may again be divided into those whose *branches begin from the ground*, and those which *shoot up in a stem before their branches begin*. Trees which have some, not much clear stem, as several of the firs, belong to the former class; but a very short stem will rank a shrub, such as the althæa, in the latter.

Of those whose branches begin from the ground, some rise in a *conical figure*, as the larch, the cedar of Lebanon, and the holly; some *swell out in the middle of their growth, and diminish at both ends*, as the Weymouth pine, the mountain ash, and the lilac: and some are *irregular and bushy* from the top to the bottom, as the evergreen oak, the Virginian cedar, and Guelder rose.

There is a great difference, between one whose *base is very large*, and another whose *base is very small*, in proportion to its height: the cedar of Lebanon, and the cypress, are instances of this difference; yet in both the branches begin from the ground.

The heads of those which shoot up into a stem before their branches begin, sometimes are *slender cones*, as of many firs: sometimes are *broad cones*, as of the horse-chestnut; sometimes they are *round*, as of the stone-pine, and most sorts of fruit-trees; and sometimes *irregular*, as of the elm. Of this last kind there are many considerable varieties.

The branches of some grow *horizontally*, as of the oak. In others they *tend upwards*, as in the almond, and in several sorts of broom and of willows. In others they *fall*, as in the lime, and the acacia: and in some of these last they *incline obliquely*, as in many of the firs; in some they *hang directly down*, as in the weeping willow.

These are the most obvious great distinctions in the shapes of trees and shrubs. The differences between shades of green cannot be so considerable; but these also will be found well deserving of attention.

Some are of a *dark green*, as the horse-chestnut and the yew; some of a *light green*, as the lime and the laurel; some of a *green tinged with brown*, as the Virginian cedar; some of a *green tinged with white*, as the arbutus and the sage tree; and some of a *green tinged with yellow*, as the alden-leaved maple and the Chinese arbutus vitæ. The variegated plants also are generally entitled to be classed with the white, or the yellow, by the strong tincture of the one or the other of those colours on their leaves.

Other

Section II.
Wood.

Other considerations concerning colours will soon be suggested: the present inquiry is only into great fixed distinctions. Those in the shapes and the greens of trees and shrubs have been mentioned: there are others, as great and as important, in their growths; but they are too obvious to deserve mentioning. Every gradation, from the most humble to the most lofty, has, in certain situations, particular effects: it is unnecessary to divide them into stages.

15
Variety arising from those differences.

ONE principal use in settling these characteristic distinctions, is to point out the stores whence varieties may at all times be readily drawn, and the causes by which sometimes inconsistencies may be accounted for. Trees which differ but in one of these circumstances, whether of shape, of green, or of growth, though they agree in every other, are sufficiently distinguished for the purpose of variety: if they differ in two or three, they become contrasts; if in all, they are opposites, and seldom groupe well together. But there are intermediate degrees, by which the most distant may be reconciled: the upright branches of the almond mix very ill with the falling boughs of the weeping willow; but an interval filled with other trees, in figure between the two extremes, renders them at least not unsightly in the same plantation. Those, on the contrary, which are of one character, and are distinguished only as the characteristic mark is strongly or faintly impressed upon them, as a young beech and a birch, an acacia and a larch, all pendant, though in different degrees, form a beautiful mass, in which unity is preserved without sameness; and still finer groupings may often be produced by greater deviations from uniformity into contrast.

Occasions to shew the effects of particular shapes in certain situations will hereafter so frequently occur, that a further illustration of them now would be needless. But there are besides, sometimes in trees, and commonly in shrubs, still *more minute varieties*,—in the turn of the branches, in the form and the size of the foliage, which generally catch, and often deserve attention. Even the texture of the leaves frequently occasions many different appearances: some have a stiffness, some an agility, by which they are more or less proper for several purposes; on many there is a gloss, very useful at times to enliven, at other times too glittering for the hue of the plantation. But all these inferior varieties are below our notice in the consideration of great effects: they are of consequence only where the plantation is near to the sight; where it skirts a home-scene, or borders the side of a walk: and in a shrubbery, which in its nature is little both in style and in extent, they should be anxiously sought for. The noblest wood is not indeed disguised by them; and when a wood, having served as a great object to one spot, becomes in another the edge of a walk, little circumstances, varying with ceaseless change along the outline, will then be attended to: but where-ever these minute varieties are sitting, the grossest taste will feel the propriety, and the most curious observation will suggest the distinctions: a detail of all would be endless; nor can they be reduced into classes. To range the shrubs and small trees so that they may mutually set off the beauties, and conceal the blemishes, of each other; to aim at no effects which depend on a nicety for their success, and which the soil,

the exposure, or the season of the day, may destroy; to attend more to the groupes than to the individuals; and to consider the whole as a plantation, not as a collection of plants; are the best general rules which can be given concerning them.

16
Of the mixture of greens.

THE different tints of greens may seem at first sight to be rather minute varieties than characteristic distinctions: but upon experience it will be found, that from small beginnings they lead to material consequences; that they are more important on the broad expanse, than along the narrow outline of a wood; and that by their union, or their contrast, they produce effects not to be disregarded in scenes of extent and of grandeur.

A hanging wood in autumn is enriched with colours, whose beauty cheers the approaches of the inclement season they forebode: but when the trees first droop, while the verdure as yet only begins to fade, they are no more than stronger tints of those colours with which the greens in their vigour are shaded; and which now are succeeded by a paler white, a brighter yellow, or a darker brown. The effects are not different; they are only more faintly impressed at one time than another; but when they are strongest, they are most observable. The fall of the leaf, therefore, is the time to learn the species, the order, and the proportion of tints, which blended will form *beautiful masses*; and, on the other hand, to distinguish those which are *incompatible* near together.

The peculiar beauty of the tints of red cannot then escape observation, and the want of them throughout the summer-months must be regretted: but that want, though it cannot perfectly, may partially be supplied; for plants have a *permanent* and an *accidental* colour. The permanent is always some shade of green; but any other may be the accidental colour; and there is none which so many circumstances concur to produce as a red. It is assumed in succession by the bud, the blossom, the berry, the bark, and the leaf. Sometimes it profusely overpreads, at other times it dimly tinges the plant; and a *reddish green* is generally the hue of those plants, on which it lasts long, or frequently returns.

Admitting this, at least for many months in the year, among the characteristic distinctions, a large piece of red green, with a narrow edging of dark green along the further side of it, and beyond that a piece of light green larger than the first, will be found to compose a beautiful mass. Another, not less beautiful, is a yellow green nearest to the eye, beyond that a light green, then a brown green, and lastly a dark green. The dark green must be the largest, the light green the next in extent, and the yellow green the least of all.

From these combinations, the agreements between particular tints may be known. A light green may be next either to a yellow or a brown green, and a brown to a dark green, all in considerable quantities; and a little rim of dark green may border on a red or a light green. Further observations will shew, that the yellow and the white greens connect easily; but that a large quantity of the light, the yellow, or the white greens, does not mix well with a large quantity also of the dark green; and that to form a pleasing mass, either the dark green must

must be reduced to a mere edging, or a brown or an intermediate green must be interposed: that the red, the brown, and the intermediate greens, agree among themselves: and that any of them may be joined to any other tint; but that the red green will bear a larger quantity of the light than of the dark green near it, nor does it seem for proper a mixture with the white green as with the rest.

In massing these tints, an attention must be constantly kept up to their *forms*, that they do not lie in large stripes one beyond another; but that either they be quite intermingled, or, which is generally more pleasing, that considerable pieces of different tints, each a beautiful figure, be, in different proportions, placed near together. Exactness in the shapes must not be attempted, for it cannot be preserved; but if the great outlines be well drawn, little variations, afterwards occasioned by the growth of the plants, will not spoil them.

17
Effects arising from the disposition of the greens.

A *SMALL* thicket is generally most agreeable, when it is one fine mass of well-mixed greens: that mass gives to the whole a *unity*, which can by no other means be so perfectly expressed. When more than one is necessary for the extent of the plantation, still if they are too much contrasted, if the gradations from one to another are easy, the unity is not broken by the variety.

While the union of tints is productive of pleasing effects, strong effects may, on the other hand, be sometimes produced by their *disagreements*. Opposites, such, for instance, as the dark and light greens, in large quantities close together, break to pieces the surface upon which they meet; and an outline which cannot be sufficiently varied in form, may be in appearance, by the management of its shades: every opposition of tints is a break in a continued line: the depth of recesses may be deepened by darkening the greens as they retire; a tree which stands out from a plantation may be separated by its tint as much as by its position; the appearance of solidity or airiness in plants depends not solely on the thickness or thinness, but partly on the colour of the leaves; clumps at a distance, may be rendered more or less distinct by their greens; and the fine effect of a dark green tree, or groupe of trees, with nothing behind it but the splendor of a morning or the glow of an evening sky, cannot be unknown to any who was ever delighted with a picture of Claude, or with the more beautiful originals in nature.

Another effect attainable by the aid of the different tints, is founded on the first principles of *perspective*. Objects grow faint as they retire from the eye; a detached clump, or a single tree, of the lighter greens, will, therefore, seem farther off than one equidistant of a darker hue; and a regular gradation from one tint to another will alter the apparent length of a continued plantation, according as the dark or light greens begin the gradation. In a straight line this is obvious; in a broken one, the fallacy in the appearance is seldom detected, only because the real extent is generally unknown; but experiments will support the principle, if they are made on plantations not very small, nor too close to the eye: the several parts may then be shortened or lengthened, and the variety of the outline be improved by a judicious arrangement of greens.

OTHER effects arising from mixtures of greens will occasionally present themselves in the *disposition* of a wood, which is the next consideration. Wood, as a general term, comprehends all trees and shrubs in whatever disposition; but it is specifically applied in a more limited sense, and in that sense we shall now use it.

Every plantation must be either a *wood*, a *grove*, a *clump*, or a *single tree*.

A wood is composed both of trees and underwood, covering a considerable space. A grove consists of trees without underwood. A clump differs from either only in extent: it may be either close or open: when close, it is sometimes called a *thicket*; when open, a *groupe of trees*; but both are equally clumps, whatever may be the shape or situation.

ONE of the noblest objects in nature is the *surface* of a large thick wood, commanded from an eminence, or seen from below, hanging on the side of a hill. The latter is generally the more interesting object. Its aspiring situation gives it an air of greatness; its termination is commonly the horizon: and, indeed, if it is deprived of that splendid boundary, if the brow appears above it, (unless some very peculiar effect characterizes that brow), it loses much of its magnificence: it is inferior to a wood which covers a less hill from the top to the bottom; for a whole space filled is seldom little: but a wood commanded from an eminence is generally no more than a part of the scene below; and its boundary is often inadequate to its greatness. To continue it, therefore, till it winds out of sight, or loses itself in the horizon, is generally desirable: but then the varieties of its surface grow confused as it retires; while those of a hanging wood are all distinct; the furthest parts are held up to the eye; and none are at a distance, though the whole be extensive.

The varieties of a surface are essential to the beauty of it: a continued smooth shaven level of foliage is neither agreeable nor natural; the different growths of trees commonly break it in reality, and their shadows still more in appearance. These shades are so many tints, which, undulating about the surface, are its greatest embellishment; and such tints may be produced with more effect, and more certainty, by a judicious mixture of greens; at the same time an additional variety may be introduced, by grouping and contrasting trees very different in shape from each other: and whether variety in the greens or in the forms be the design, the execution is often easy, and seldom to a certain degree impossible. In raising a young wood, it may be perfect. In old woods, there are many spots which may be either thinned or thickened: and there the characteristic distinctions should determine what to plant, or what to leave; at the least will often point out those which, as blemishes, ought to be taken away; and the removal of two or three trees will sometimes accomplish the design. The number of beautiful forms, and agreeable masses, which may decorate the surface, is so great, that where the place will not admit of one, another is always ready; and as no delicacy of finishing is required, no minute exactness is worth regarding, great effects will not be disconcerted by small obstructions and little disappointments.

The contrasts, however, of masses and of groupes must not be too strong, where *greatness* is the character.

19
Of the surface of a wood distinguished by its greatness.

ter of the wood; for unity is essential to greatness; and if direct opposites be placed close together, the wood is no longer one object; it is only a confused collection of several separate plantations. But if the progress be gradual from the one to the other, shapes and tints widely different may assemble on the same surface; and each should occupy a considerable space: a single tree, or a small cluster of trees, in the midst of an extensive wood, is in size but a speck, and in colour but a spot; the groupings and the masses must be large to produce any sensible variety.

Yet single trees in the midst of a wood, though seldom of use to diversify a surface, often deserve particular regard as individuals, and are important to the greatness of the whole. The superficies of a shrubby thicket, how extensive soever, does not convey the same ideas of magnificence, as that of a hanging wood: and yet, at first sight, the difference is not always very discernible. It often requires time to collect the several circumstances in the latter, which suggest the elevation to which that broad expanse of foliage is raised, the vastness of the trunks which support it so high, the extent of the branches which spread it so far. When these circumstances, all of grandeur, crowd together upon the mind, they dignify the space; which, without them, might, indifferently, be the superficies of a thicket or the surface of a wood: but a few large trees, not eminent above all about them, but distinguished by some slight separation, and obvious at a glance, immediately resolve the doubt. They are noble objects in themselves; become the situation; and serve as a measure to the rest. On the same principle, trees which are thin of boughs and of leaves, those whose branches tend upwards, or whose heads rise in slender cones, have an appearance more of airiness than of importance; and are blemishes in a wood, where greatness is the prevailing idea. Those, on the contrary, whose branches hang directly down, have a breadth of head, which suits with such a situation, though their own peculiar beauty be lost in it.

These decorations are natural graces, which never derogate from greatness; and a number of shades playing on the surface, over a variety of those beautiful forms into which it may be cast, enliven that sameness, which, while it prevails, reduces the merit of one of the noblest objects in nature to that of mere space. To fill that space with objects of beauty, to delight the eye after it has been struck, to fix the attention where it has been caught, and to prolong astonishment into admiration, are purposes not unworthy of the greatest designs; and, in the execution, productive of embellishments, which in style are not unequal to scenes of richness and magnificence.

WHEN, in a romantic situation, very broken ground is overspread with wood, it may be proper, on the surface of the wood, to mark the inequalities of the ground. *Rudeness*, not greatness, is the prevailing idea; and a choice directly the reverse of that which is productive of unity, will produce it. Strong contrasts, even oppositions, may be eligible; the aim is rather to disjoint than to connect: a deep hollow may sink into dark greens; an abrupt bank may be shewn by a rising stage of aspiring trees, a sharp ridge by a narrow line of conical shapes; firs are of great use

upon such occasions; their tint, their form, their singularity, recommend them.

A hanging wood of thin forest-trees, and seen from below, is seldom pleasing: those few trees, are by the perspective brought nearer together; it loses the beauty of a thin wood, and is defective as a thick one: the most obvious improvement, therefore, is to thicken it. But, when seen from an eminence, a thin wood is often a lively and elegant circumstance in a view; it is full of objects; and every separate tree shews its beauty. To increase that vivacity, which is the peculiar excellence of a thin wood, the trees should be characteristically distinguished both in their tints and their shapes; and such as for their airiness have been proscribed in a thick wood, are frequently the most eligible here. Differences also in their growths are a further source of variety; each should be considered as a distinct object, unless where a small number are grouped together; and then all that compose the little cluster must agree: but the groups themselves, for the same reason as the separate trees, should be strongly contrasted; the continued underwood is their only connection, and that is not affected by their variety.

THOUGH the surface of a wood, when commanded, deserves all these attentions, yet the outline more frequently calls for our regard: it is also more in our power; it may sometimes be great, and may always be beautiful. The first requisite is irregularity. That a mixture of trees and underwood should form a long straight line, can never be natural; and a succession of easy sweeps and gentle rounds, each a portion of a greater or less circle, composing all together a line literally serpentine, is, if possible, worse. It is but a number of regularities put together in a disorderly manner, and equally distant from the beautiful both of art and of nature. The true beauty of an outline consists more in breaks than in sweeps; rather in angles than in rounds; in variety, not in succession.

The outline of a wood is a continued line, and small variations do not save it from the insipidity of sameness: one deep recess, one bold prominence, has more effect than twenty little irregularities. That one divides the line into parts, but no breach is thereby made in its unity; a continuation of wood always remains; the form of it only is altered, and the extent is increased. The eye, which hurries to the extremity of whatever is uniform, delights to trace a varied line through all its intricacies, to pause from stage to stage, and to lengthen the progress. The parts must not, however, on that account be multiplied till they are too minute to be interesting, and so numerous as to create confusion. A few large parts should be strongly distinguished in their forms, their directions, and their situations; each of these may afterwards be decorated with subordinate varieties; and the mere growth of the plants will occasion some irregularity; on many occasions, more will not be required.

Every variety in the outline of a wood must be a prominence, or a recess. Breadth in either is not so important as length to the one, and depth to the other. If the former ends in an angle, the latter diminishes to a point; they have more force than a shallow dent, or a dwarf excrescence, how wide soever. They are greater deviations from the continued line which they are intended to break; and their effect is to enlarge

19
Of the surface of a romantic, and of a thin wood.

21
Of the outline of a wood.

Section II.
Wood.Section II.
Wood.

the wood itself, which seems to stretch from the most advanced point, back beyond the most distant to which it retires. The extent of a large wood on a flat, not commanded, can by no circumstance be so manifestly shewn, as by a deep recess; especially if that recess wind so as to conceal the extremity, and leave the imagination to pursue it. On the other hand, the poverty of a shallow wood might sometimes be relieved by here and there a prominence, or clumps, which by their apparent junction should seem to be prominences from it. A deeper wood with a continued outline, except when commanded, would not appear so considerable.

An inlet into a wood seems to have been cut, if the opposite points of the entrance tally; and that show of art depreciates its merit; but a difference only in the situation of those points, by bringing one more forward than the other, prevents the appearance, though their forms be similar. Other points, which distinguish the great parts, should in general be strongly marked: a short turn has more spirit in it than a tedious circuit; and a line broken by angles has a precision and firmness, which in an undulated line are wanting: the angles should indeed commonly be a little softened; the rotundity of the plant which forms them is sometimes sufficient for the purpose; but if they are mellowed down too much, they lose all meaning. Three or four large parts thus boldly distinguished, will break a very long outline; more may be, and often ought to be, thrown in, but seldom are necessary: and when two woods are opposed on the sides of a narrow glade, neither has so much occasion for variety in itself as if it were single; if they are very different from each other, the contrast supplies the deficiency to each, and the interval between them is full of variety. The form of that interval is indeed of as much consequence as their own: though the outlines of both the woods be separately beautiful, yet if together they do not cast the open space into an agreeable figure, the whole scene is not pleasing; and a figure is never agreeable, when the sides too closely correspond; whether they are exactly the same, or exactly the reverse of each other, they equally appear artificial.

Every variety of outline hitherto mentioned, may be traced by the *underwood* alone; but frequently the same effects may be produced with more ease, and with much more beauty, by a *few trees* standing out from the thicket, and belonging, or seeming to belong, to the wood, so as to make a part of its figure. Even where they are not wanted for that purpose, detached trees are such agreeable objects, so distinct, so light, when compared to the covert about them, that skirting along it in some parts, and breaking it in others, they give an unselected grace, which can no otherwise be given to the outline. They have a still further effect, when they stretch across the whole breadth of an inlet, or before part of a recess into the wood; they are themselves shewn to advantage by the space behind them, and that space, seen between their stems, they in return throw into an agreeable perspective. An inferior grace of the same kind may be often introduced, only by distinguishing the boles of some trees in the wood itself, and keeping down the thicket beneath them. Where even this cannot be well executed, still the outline may be filled with such trees and shrubs as swell out in the middle of their growth,

Vol. V.

and diminish at both ends; or with such as rise in a slender cone; with those whose branches tend upwards; or whose base is very small in proportion to their height; or which are very thin of boughs and of leaves. In a confined garden-scene, which wants room for the effect of detached trees, the outline will be heavy, if these little attentions are disregarded.

THE prevailing character of a wood is generally grandeur; the principal attention therefore which it requires, is to prevent the excesses of that character, to diversify the uniformity of its extent, to lighten the unwieldiness of its bulk, and to blend graces with greatness. But the character of a grove is *beauty*. Fine trees are lovely objects: a grove is an assemblage of them; in which every individual retains much of its own peculiar elegance, and whatever it loses is transferred to the superior beauty of the whole. To a grove, therefore, which admits of endless variety in the disposition of the trees, differences in their shapes and their greens are seldom very important, and sometimes they are detrimental. Strong contrasts scatter trees which are thinly planted, and which have not the connection of underwood; they no longer form one plantation; they are a number of single trees. A thick grove is not indeed exposed to this mischief, and certain situations may recommend different shapes and different greens for their effects upon the *surface*; but in the *outline* they are seldom much regarded. The eye attracted into the depth of the grove, passes by little circumstances at the entrance; even varieties in the form of the line do not always engage the attention: they are not so apparent as in a continued thicket, and are scarcely seen if they are not considerable.

BUT the surface and the outline are not the only circumstances to be attended to. Though a grove be beautiful as an object, it is besides delightful as a spot to walk or to sit in; and the choice and the disposition of the trees for effects *within*, are therefore a principal consideration. Mere irregularity alone will not please: strict order is there more agreeable than absolute confusion; and some meaning better than none. A regular plantation has a degree of beauty; but it gives no satisfaction, because we know that the same number of trees might be more beautifully arranged. A disposition, however, in which the lines only are broken, without varying the distances, is less natural than any; for though we cannot find straight lines in a forest, we are habituated to them in the hedge-rows of fields; but neither in wild nor in cultivated nature do we ever see trees equi-distant from each other: that regularity belongs to art alone. The distances, therefore, should be strikingly different: the trees should gather into groupes, or stand in various irregular lines, and describe several figures: the intervals between them should be contrasted both in shape and in dimensions: a large space should in some places be quite open; in others the trees should be so close together, as hardly to leave a passage between them; and in others as far apart as the connection will allow. In the forms and the varieties of these groupes, these lines, and these openings, principally consists the interior beauty of a grove.

The force of them is most strongly illustrated at Claremont; where the walk to the cottage, though destitute of many natural advantages, and eminent for

21
Surface and
outline of a
grove.23
The interior
of a
grove.24
Description
of a grove
at Clare-
mont, (near
Esher in
Surrey.)

Section II.
Wood.

Section II.
Wood.

none; though it commands no prospect; though the water below it is a trifling pond; though it has nothing, in short, but inequality of ground to recommend it; is yet the finest part of the garden: for a grove is there planted in a gently curved direction, all along the side of a hill, and on the edge of a wood, which rises above it. Large recesses break it into several clumps, which hang down the declivity; some of them approaching, but none reaching quite to the bottom. These recesses are so deep as to form great openings in the midst of the grove; they penetrate almost to the covert: but the clumps being all equally suspended from the wood; and a line of open plantation, though sometimes narrow, running constantly along the top; a continuation of grove is preserved, and the connection between the parts is never broken. Even a groupe, which near one of the extremities stands out quite detached, is still in style so similar to the rest, as not to lose all relation. Each of these clumps is composed of several others still more intimately united: each is full of groupes, sometimes of no more than two trees, sometimes of four or five, and now and then in larger clusters: an irregular waving line, issuing from some little crowd, loses itself in the next; or a few scattered trees drop in a more distant succession from the one to the other. The intervals, winding here like a glade, and widening there into broader openings, differ in extent, in figure, and direction; but all the groupes, the lines, and the intervals, are collected together into large general clumps, each of which is at the same time both compact and free, identical and various. The whole is a place wherein to tarry with secure delight, or fainter with perpetual amusement.

25
Grove at
Esher-place,
(contiguous
to Clare-
mont.)

The grove at Esher-place was planted by the same masterly hand; but the necessity of accommodating the young plantation to some large trees which grew there before, has confined its variety. The groupes are few and small; there was not room for larger or for more: there were no opportunities to form continued narrow glades between opposite lines; the vacant spaces are therefore chiefly irregular openings spreading every way, and great differences of distance between the trees are the principal variety; but the grove winds along the bank of a large river, on the side and at the foot of a very sudden ascent, the upper part of which is covered with wood. In one place, it presses close to the covert; retires from it in another; and stretches in a third across a bold recess, which runs up high into the thicket. The trees sometimes overspread the flat below; sometimes leave an open space to the river; at other times crown the brow of a large knole, climb up a steep, or hang on a gentle declivity. These varieties in the situation more than compensate for the want of variety in the disposition of the trees; and the many happy circumstances which concur

—In Esher's peaceful grove,
Where Kent and nature vie for Pelham's love,

render this little spot more agreeable than any at Claremont. But though it was right to preserve the trees already standing, and not to sacrifice great present beauties to still greater in futurity; yet this attention has been a restraint; and the grove at Claremont, considered merely as a plantation, is in delicacy of taste, and fertility of invention, superior to that at Esher.

Both were early essays in the modern art of garden-

ing: and, perhaps from an eagerness to shew the effect, the trees in both were placed too near together: though they are still far short of their growth, they are run up into poles, and the groves are already past their prime; but the temptation to plant for such a purpose no longer exists, now that experience has justified the experiment. If, however, we still have not patience to wait, it is possible to secure both a present and a future effect, by fixing first on a disposition which will be beautiful when the trees are large, and then intermingling another which is agreeable while they are small. These occasional trees are hereafter to be taken away; and must be removed in time, before they become prejudicial to the others.

The consequence of variety in the disposition, is variety in the light and shade of the grove; which may be improved by the choice of the trees. Some are impenetrable to the fiercest sun-beam; others let in here and there a ray between the large masses of their foliage; and others, thin both of boughs and of leaves, only chequer the ground. Every degree of light and shade, from a glare to obscurity, may be managed, partly by the number, and partly by the texture, of the trees. Differences only in the manner of their growths have also corresponding effects: there is a closeness under those whose branches descend low, and spread wide; a space and liberty where the arch above is high; and frequent transitions from the one to the other are very pleasing. These still are not all the varieties of which the interior of a grove is capable: trees indeed, whose branches nearly reach the ground, being each a sort of thicket, are inconsistent with an open plantation: but though some of the characteristic distinctions are thereby excluded, other varieties more minute succeed in their place; for the freedom of passage throughout brings every tree in its turn near to the eye, and subjects even differences in foliage to observation. These, slight as they may seem, are agreeable when they occur: it is true, they are not regretted when wanting; but a defect of ornament is not necessarily a blemish.

It has been already observed, that clumps differ only in extent from woods, if they are close; or from groves, if they are open: they are small woods, and small groves, governed by the same principles as the larger, after allowances made for their dimensions. But besides the properties they may have in common with woods or with groves, they have others peculiar to themselves, which require examination.

They are either *independent* or *relative*: when independent, their beauty, as single objects, is solely to be attended to; when relative, the beauty of the individuals must be sacrificed to the effect of the whole, which is the greater consideration.

The least clump that can be, is of two trees; and the best effect they can have is, that their heads united should appear one large tree: two therefore of different species, or seven or eight of such shapes as do not easily join, can hardly be a beautiful groupe, especially if it have a tendency to a circular form. Such clumps of firs, though very common, are seldom pleasing; they do not compose one mass, but are only a confused number of pinnacles. The confusion is however avoided, by placing them in succession, not in clusters; and a clump of such trees is therefore more agreeable when it is ex-

teached

16
Of the
forms of
clumps.

section II.
Wood.section II.
Wood.

tended rather in length than in breadth.

Three trees together must form either a right line, or a triangle: to disguise the regularity, the distances should be very different. Distinctions in their shapes contribute also to the same end; and a variety in their growths still more. When a straight line consists of two trees nearly similar, and of a third much lower than they are, the even direction in which they stand is hardly discernible.

If humbler growths at the extremity can discompose the strictest regularity, the use of them is thereby recommended upon other occasions. It is indeed the variety peculiarly proper for clumps: every apparent artifice affecting the objects of nature, disguises; and clumps are such distinguished objects, so liable to the suspicion of having been left or placed on purpose to be so distinguished, that, to divert the attention from these symptoms of art, irregularity in the composition is more important to them than to a wood or to a grove: being also less extensive, they do not admit so much variety of outline: but variety of growths is most observable in a small compass; and the several gradations may often be cast into beautiful figures.

The extent and the outline of a wood or a grove engage the attention more than the extremities; but in clumps the last are of the most consequence: they determine the form of the whole; and both of them are generally in sight: great care should therefore be taken to make them agreeable and different. The ease with which they may be compared, forbids all similarity between them: for every appearance of equality suggests an idea of art; and therefore a clump as broad as it is long, seems less the work of nature than one which stretches into length.

Another peculiarity of clumps, is the facility with which they admit a mixture of trees and of shrubs, of wood and of grove; in short, of every species of plantation. None are more beautiful than those which are so composed. Such compositions are, however, more proper in compact than in straggling clumps: they are most agreeable when they form one mass: if the transitions from very lofty to very humble growths, from thicket to open plantations, be frequent and sudden, the disorder is more suited to rude than to elegant scenes.

The occasions on which independent clumps may be applied, are many. They are often desirable as beautiful objects in themselves; they are sometimes necessary to break an extent of lawn, or a continued line, whether of ground or of plantation; but on all occasions a jealousy of art constantly attends them, which irregularity in their figure will not always alone remove. Though elevations shew them to advantage, yet a hillock evidently thrown up on purpose to be crowned with a clump, is artificial to a degree of disgust: some of the trees should therefore be planted on the sides, to take off that appearance. The same expedient may be applied to clumps placed on the brow of a hill, to interrupt its sameness: they will have less ostentation of design, if they are in part carried down either declivity. The objection already made to planting many along such a brow, is on the same principle: a single clump is less suspected of art; if it be an open one, there can be no finer situation for it, than just at the point of an abrupt hill, or on a promontory into a

lake or a river. It is in either a beautiful termination, distinct by its position, and enlivened by an expanse of sky or of water about and beyond it. Such advantages may balance little defects in its form: but they are lost if other clumps are planted near it; art then intrudes, and the whole is displeasing.

But though a multiplicity of clumps, when each is an independent object, seldom seems natural; yet a number of them may, without any appearance of art, be admitted into the same scene, if they bear a relation to each other: if by their succession they diversify a continued outline of wood, if between them they form beautiful glades, if all together they cast an extensive lawn into an agreeable shape, the effect prevents any scrutiny into the means of producing it. But when the reliance on that effect is so great, every other consideration must give way to the beauty of the whole. The figure of the glade, of the lawn, or of the wood, are principally to be attended to: the finest clumps, if they do not fall easily into the great lines, are blemishes; their connections, their contrals, are more important than their forms.

A line of clumps, if the intervals be closed by others beyond them, has the appearance of a wood, or of a grove; and in one respect the semblance has an advantage over the reality. In different points of view, the relations between the clumps are changed, and a variety of forms is produced, which no continued wood or grove, however broken, can furnish. These forms cannot all be equally agreeable; and too anxious a solicitude to make them every where pleasing, may, perhaps, prevent their being ever beautiful. The effect must often be left to chance; but it should be studiously consulted from a few principal points of view; and it is easy to make any recess, any prominence, any figure in the outline, by clumps thus advancing before, or retreating behind one another.

But amidst all the advantages attendant on this species of plantation, it is often exceptional when commanded from a neighbouring eminence: clumps below the eye lose some of their principal beauties, and a number of them betray the art of which they are always liable to be suspected; they compose no surface of wood, and all effects arising from the relations between them are entirely lost. A prospect spotted with many clumps can hardly be great: unless they are so distinct as to be objects, or so distant as to unite into one mass, they are seldom an improvement of a view.

The proper situations for single trees are frequently the same as for clumps: the choice will often be determined, solely by the consideration of proportion between the object, and the spot it is intended to occupy; and if the desired effect can be attained by a single tree, the simplicity of the means recommends it. Sometimes it will be preferred merely for variety; and may be used to mark one point in a scene in which two or three points are already distinguished by clumps. It may occasionally be applied to most of the purposes for which clumps are used: may be an independent object; may interrupt a continued line, or decorate an extent of space. There is but one effect resulting from clumps which may not to a certain degree be produced by single trees: a number of them will never unite into one large mass; but more distant relations may be observed between them. Scattered about a lawn, they

23
Of clumps which have a relation to each other.

29
Of single trees.

27
Uses and situations of independent clumps.

may cast it into an agreeable shape; and to produce that shape, each must be placed with an attention to the rest: they may stand in particular directions, and collectively form agreeable figures; or between several straggling trees little glades may open, full of variety and beauty. The lines they trace are fainter than those which larger plantations describe; but then their forms are their own: they are therefore absolutely free from all appearance of art; any disposition of them, if it be but irregular, is sure to be natural.

The situations of single trees is the first consideration, and differences in the distances between them their greatest variety. In shape, they admit of no choice but that which their species affords: greatness often, beauty often, sometimes mere solidity, and now and then peculiarity alone, recommends them. Their situations will also frequently determine the species. If they are placed before a continued line of wood only to break it, they should commonly be similar to the trees in that wood; they will else lose their connection, and not affect the outline which they are intended to vary; but if they are designed to be independent objects, they are as such more discernible when distinguished, both in their shapes and their greens, from any plantations about them. After all, the choice, especially in large scenes, is much confined to the trees on the spot. Young clumps from the first have some, and soon produce a considerable effect: but a young single tree for many years has none at all: and it is often more judicious to preserve one already growing, though not exactly such as might be wished, either in itself, or in its situation, than to plant in its stead another, which may be a finer object, and better placed, in a distant futurity.

SECT. III. *Of Water.*

30
Effects and
species of
water.

In considering the subjects of gardening, ground and wood first present themselves: water is the next; which, though not absolutely necessary to a beautiful composition, yet occurs so often, and is so capital a feature, that it is always regretted when wanting; and no large place can be supposed, a little spot can hardly be imagined, in which it may not be agreeable. It accommodates itself to every situation; is the most interesting object in a landscape, and the happiest circumstance in a retired recess; captivates the eye at a distance, invites approach, and is delightful when near: it refreshes an open exposure; it animates a shade; cheers the dreariness of a waste, and enriches the most crowded view. In form, in style, and in extent, it may be made equal to the greatest compositions, or adapted to the least: it may spread in a calm expanse to soothe the tranquillity of a peaceful scene; or, hurrying along a devious course, add splendor to a gay, and extravagance to a romantic, situation. So various are the characters which water can assume, that there is scarcely an idea in which it may not concur, or an impression which it cannot enforce. A deep stagnated pool, dank and dark with shades which it dimly reflects, befits the seat of melancholy; even a river, if it be sunk between two dismal banks, and dull both in motion and colour, is like a hollow eye, which deadens the countenance; and over a sluggish, silent stream, creeping heavily along all together, a gloom hangs, which no art can dissipate, nor even the sunshine disperse. A gently

murmuring rill, clear and shallow, just gurgling, just dimpling, imposes silence, suits with solitude, and leads to meditation: a brisker current, which wanders in little eddies over a bright sandy bottom, or babbles among pebbles, spreads cheerfulness all around: a greater rapidity, and more agitation, to a certain degree are animating; but in excess, instead of awakening, they alarm the senses: the roar and the rage of a torrent, its force, its violence, its impetuosity, tend to inspire terror; that terror which, whether as cause or effect, is so nearly allied to sublimity.

Abstracted, however, from all these ideas, from every sensation, either of depression, composure, or exertion; and considering water merely as an object; no other is so apt soon to catch, and long to fix, the attention. But it may want beauties of which we know it is capable, or the marks may be confused by which we distinguish its species; and these defects displease: to avoid them, the properties of each species must be determined.

All water is either *running*, or *stagnated*: when stagnated, it forms a *lake* or a *pool*, which differ only in extent; and a *pool* and a *pond* are the same. Running waters are either a *rivulet*, a *river*, or a *rill*; and these differ only in breadth: a *rivulet* and a *brook* are synonymous terms; a *stream* and a *current* are general names for all.

In a garden, the water is generally imitative. That which in the open country would be called a *great pond*, there assumes the name, and should be shaped as if it had the extent, of a lake; for it is large in proportion to the other parts of the place. Though sometimes a real river passes thro' a garden, yet still but a small portion of it is seen; and more frequently the semblance only of such a portion is substituted instead of the reality. In either case, the imitation is lost, if the characteristic distinctions between a lake and a river be not scrupulously preserved.

THE characteristic property of running water is *progress*; of stagnated, is *circuity*: the one stretches into length, the other spreads over space. But it is necessary that the whole circumference of a lake be seen, or that no bounds be set to the prospect of a river: on the contrary, the latter is never more beautiful than when it is lost in a wood, or retires behind a hill from the view: the former never appears so great as when its termination is concealed; the *shape*, not the *close*, denotes the character: if the opposite shores are both concave, they seem intended to surround, and to meet; if they are nearly parallel, they shew no tendency to come together, but suggest the idea of continuation.

To make both the banks of a river in concave forms is to sin against this first principle; and yet the fault is often committed, in order to increase the expanse. But when the bold sweep of a river is thus converted into an insignificant pool, more is lost to the imagination in length, than is gained to the view in breadth; and, paradoxical as the assertion may seem, it is certainly true, that the water would appear more important were it narrower. When one bank, therefore, retires, the other, if it does not advance, should, at the least, continue its former direction; or if that should be convex, it may be straitened; but both must not together depart from the appearance of progress.

Particular occasions may, however, justify a seeming

31
Differences
between a
lake and a
river.

ing deviation from the rule. To make room for an island, it may be proper to widen the river every way; for there the water is, in fact, intended to surround, and to meet; while the currents on each side preserve the principal character. The same liberty may also be allowed on the influx of a collateral stream; and the accession will account for both the breadth and for the shape: but the licence must here be used with moderation, lest the wide place become principal, and divide the river into two streams, the one falling into a pool, and the other issuing from it. Both the sides of a lake may at all times retire; but on such an accession, the increase should be chiefly on the shore opposite to the collateral stream, that it may appear to be a real enlargement of the lake, and not merely the mouth of a river.

A collateral stream should, in general, keep, or seem to keep, for some way, to nearly the same breadth: if it diminishes very fast, it must soon come to an end, and has more the appearance of a creek than of a stream. Whether it be the one or the other, may be matter of indifference when it falls into a lake; but a creek is seldom agreeable in a river; it diverts the current, its waters seem stagnated, it weakens the idea of progress.

All recesses in which the current is lost, are blemishes in a river. A bay is as exceptionable as a creek. Whatever be the form, if it be a receptacle, not a passage, it is a symptom that the water rather spreads than proceeds, and hurts the character of the river. But a head-land, which only turns or contracts the stream, though it make a sort of bay, is not liable to the same objection. Such a bay has a vent; such an obstruction only strengthens the current; they do not suggest the most distant idea of stagnation: It is almost needless to add, that in a lake, just the reverse of a river, creeks, bays, recesses of every kind, are always in character, sometimes necessary, and generally beautiful: the objections to them in the one, are recommendations of them to the other.

32
Of a lake.

Besides the circumstances, which have been mentioned, and in which a river and a lake essentially differ; besides those in which they agree, and which are too obvious to require illustration; there are some peculiar to each character, and which, though common in the one, can hardly occur in the other; at least, not so often, nor to that degree, as to become subjects of comparison.

Space is essential to a lake; it may spread to any extent; and the mind, always pleased to expand itself on great ideas, delights even in its vastness. A lake cannot be too large as a subject of description or of contemplation: but the eye receives little satisfaction when it has not a form on which to rest: the ocean itself hardly atones by all its grandeur for its infinity; and a prospect of it is, therefore, always most agreeable, when in some part, at no great distance, a reach of shore, a promontory, or an island, reduces the immensity into shape. If the most extensive view which can be the object of vision, must be restrained in order to be pleasing; if the noblest ideas, which the creation can suggest, must be checked in their career, before they can be reconciled to the principles of beauty; an offence against those principles, a transgression of that restraint, will not easily be forgiven on a subject less

than infinite: a lake whose bounds are out of sight, is circumscribed in reality, not in appearance; at the same time that it disappoints the eye, it confines the imagination; it is but a waste of waters, neither interesting nor agreeable.

A distant flat coast, dimly and doubtfully seen, does not obviate the objection; but it may be the means of removing it; for elevation and distinctness give an appearance of proximity, and contract the space they limit. This is the constant effect of a high shore: a low one, covered with wood, is in reality raised; and marked by buildings, becomes more conspicuous; it acquires an artificial elevation and distinctness.

These observations, though immediately relative to very large bodies of water, are still applicable to imitative lakes in parks and gardens. The principles upon which they are founded are equally true in both; and though an artificial lake cannot be supposed, which shall be absolutely, yet comparatively it may be extravagant. It may be so, out of proportion to its appendages, as to seem a waste of water; for all size is in some respects relative: if this exceeds its due dimensions, and if a flatness of shore beyond it adds still to the dreariness of the scene, wood to raise the banks, and objects to distinguish them, will, from the same cause, produce the same effects as on a larger scale. If the length of a piece of water be too great for its breadth, so as to destroy all idea of circuitry, the extremities should be considered as too far off, and made important, to give them proximity; while at the same time the breadth may be favoured, by keeping down the banks on the sides. On the same principle, if the lake be too small, a low shore will, in appearance, increase the extent.

But it is not necessary that the whole scene be bounded: if form be impressed on a considerable part, the eye can, without disgust, permit a large reach to stretch beyond its ken; it can even be pleased to observe a tremulous motion in the horizon, which shews that the water has not there yet attained its termination. Still short of this, the extent may be kept in uncertainty; a hill or a wood may conceal one of the extremities, and the country beyond it, in such a manner as to leave room for the supposed continuation of so large a body of water. Opportunities to choose this shape are frequent, and it is the most perfect of any; the scene is closed, but the extent of the lake is undetermined; a complete form is exhibited to the eye, while a boundless range is left open to the imagination.

But mere form will only give content, not delight: that depends upon the outline, which is capable of exquisite beauty; and the *bays*, and the *creeks*, and the *promontories*, which are ordinary parts of that outline, together with the accidents of *islands*, of *inlets* and of *outlets* to rivers, are in their shapes and their combinations an inexhaustible fund of variety.

A straight line of considerable length may find a place in that variety; and it is sometimes of singular use to prevent the semblance of a river in a channel formed between islands and the shore. But no figure perfectly regular ought ever to be admitted; it always seems artificial, unless its size absolutely forbid the supposition. A semicircular bay, though the shape be beautiful, is not natural; and any rectilinear figure is

abso-

absolutely ugly: but if one line be curved, another may sometimes be almost straight: the contrast is agreeable; and to multiply the occasions of shewing contrasts, may often be a reason for giving several directions to a creek, and more than two sides to a promontory.

Bays, creeks, and promontories, though extremely beautiful, should not, however, be very numerous: for a shore broken into little points and hollows has no certainty of outline; it is only ragged, not diversified; and the distinctness and simplicity of the great parts are hurt by the multiplicity of subdivisions. But islands, though the channels between them be narrow, do not so often derogate from greatness: they intimate a space beyond them whose boundaries do not appear; and remove to a distance the shore which is seen in perspective between them. Such partial interruptions of the sight suggest ideas of extent to the imagination.

The inlets and the outlets of rivers have similar effects: fancy pursues the course of the stream far beyond the view; no limits are fixed to its excursions. The greatest composition therefore of water is that which is in part a lake, and in part a river; which has all the expanse of the one, and all the continuation of the other, each being strongly characterised to the very point of their junction. If that junction break into a side of the lake, the direction of the river should be oblique to the line it cuts; rectangular bifurcations are in this, as in all other instances, formal: but when the conflux is at an angle, so that the bank of the river coincides with one shore of the lake, they should both continue for some way in the same direction; a deviation from that line immediately at the outlet detaches the lake from the river.

THOUGH the windings of a river are proverbially descriptive of its course; yet without being perpetually wreathed, it may be natural. Nor is the character expressed only by the turnings. On the contrary, if they are too frequent and sudden, the current is reduced into a number of separate pools, and the idea of progress is obscured by the difficulty of tracing it. Length is the strongest symptom of continuation: long reaches are, therefore, characteristic of a river; and they conduce much to its beauty: each is a considerable piece of water; and variety of beautiful forms may be given to their outlines; but a straight one can very seldom be admitted: it has the appearance of a cut canal, unless great breadth, a bridge across it, and strong contrasts between the objects on the banks, disguise the formality. A very small curvature obliterates every idea of art and stagnation; and a greater is often mischievous: for an excess of deviation from a straight towards a circular line, shortens the view, weakens the idea of continuation, and tho' not chargeable with stiffness, yet approaches to regularity; whereas the line of beauty keeps at a distance from every figure which a rule can determine or a compass describe.

A considerable degree of roundness is, however, often becoming, where the stream changes its direction: and if the turn be effected by a sharp point of land on one side, there is the more occasion for circuitry on the other. The river should also be widened under that other bank: for it is the nature of water thus driven out of its course, to dash and encroach up-

on the opposite shore. Where this circumstance has been attended to, the bend appears natural; and the view ending in space, gives scope to the imagination. The turn, therefore, ought generally to be larger than a right angle: if it be less, it closes immediately, and checks the idea of progress.

To further that idea is one use of bridges. Though they cross, they do not close the view: the water is seen to run through them, and is supposed to continue far beyond them: such a communication between the opposite banks implies the want of any other, and gives both length and depth to the stream. The form of a lake, on the contrary, intimates, that all the several shores are, by making a certain circuit, accessible. Bridges, therefore, are inconsistent with the nature of a lake, but characteristic of a river: they are on that account used to disguise a termination: but the deception has been so often practised, that it no longer deceives; and a bolder aim at the same effect will now be more successful. If the end can be turned just out of sight, a bridge at some distance raises a belief, while the water beyond it removes every doubt, of the continuation of the river: the supposition immediately occurs, that if a disguise had been intended, the bridge would have been placed further back; and the disregard thus shewn to one deception, gains credit for the other.

To give to bridges their full effect, the connection between them and the river must be attended to: from the want of it, the single wooden arch, now much in fashion, seems to us generally misplaced. Elevated, without occasion, so much above, it is totally detached from the river: it is often seen straddling in the air, without a glimpse of the water to account for it: and the ostentation of it as an ornamental object, diverts all that train of ideas which its use as a communication might suggest. The wateness of Walton bridge cannot without affectation be mimicked in a garden, where the magnificent idea of including the Thames under one arch is wanting, and where the structure itself reduced to a narrow scale retains no pretensions to greatness. Unless the situation make such a height necessary, or the point of view be greatly above it, or wood or rising ground instead of sky behind it, fill up the vacancy of the arch, it seems an effort without a cause, forced and preposterous.

The vulgar foot-bridge, of planks only, guarded on one hand by a common rail, and supported by a few ordinary piles, is often more proper. It is perfect as a communication, because it pretends to nothing further: it is the utmost simplicity of cultivated nature: and if the banks from which it starts be of a moderate height, its elevation preserves it from meanness. No other species so effectually characterises a river: it seems too plain for an ornament, too obscure for a disguise: it must be for use; it can be a passage only: it is therefore spoiled, if adorned; it is disguised, if only painted of any other than a dusky colour.

But being thus incapable of all decoration and importance, it is often too humble for a great, and too simple for an elegant, scene. A stone bridge is generally more suitable to either: but in this also, an extraordinary elevation is seldom becoming, unless the grandeur compensate for the distance at which it leaves the

Section III.
WATER.

A gentle rise, and easy sweep, more closely preserve the relation : a certain degree of union should also be formed between the banks and the bridge ; that it may seem to rise out of the banks, not barely to be imposed upon them. ' It ought not generally to swell much above their level ; the parapet wall should be brought down near to the ground, or end against some swell ; and the size and the uniformity of the abutments should be broken by hillocks or thickets about them : every expedient should be used to mark the connection of the building both with the ground from which it starts, and the water which it crosses.

In wild and romantic scenes may be introduced a ruined stone-bridge, of which some arches may be still standing, and the loss of those which are fallen may be supplied by a few planks, with a rail, thrown over the vacancy. It is a picturesque object ; it suits the situation ; and the antiquity of the passage, the care taken to keep it still open though the original building is decayed, the apparent necessity which thence results for a communication, give it an imposing air of reality.

In every scene of magnificence, in some where elegance chiefly prevails, a bridge with a colonnade, or other ornamental structure upon it, is characteristically proper, and it has a peculiarity which recommends it to many situations. The colonnade is alone a perfect independent object, which may belong to several species of buildings : it may, therefore, embellish a scene where no water is visible : but the sight must not be let down below the balustrade. If the arches appear, this is like other bridges shown by themselves : they may now and then be of use to mark a continuation of water, which would otherwise be doubtful ; but in general they only remind us of what is wanting to the view.

In some situations, two or three bridges may be admitted into one scene ; a collateral stream always, the turnings of the same stream often, afford opportunities to place them in several directions ; and a greater distinction between objects is seldom required, than that between two bridges, in construction exactly alike, one of which presents the passage over it, and the other that under it, to the eye. Such a variety of beautiful forms have besides been invented for them, that, in similar positions, they may be objects in very different styles : and collateral circumstances occasion still further distinctions. A bridge, which, by means of a bend in the river, is backed with wood or rising grounds, has, in the effect, little similarity to one through which nothing can be seen but the water and the sky : and if the accident which distinguishes, immediately groups with the bridge ; if, for instance, a tree, or a little cluster of trees, stand so that the stems appear beneath, the heads above the arches ; the whole is but one picturesque object, which retains no more than a distant resemblance to a bridge quite simple and unaccompanied. Amidst all this variety, two or three may easily be chosen, which, in the same landscape, so far from assimilating, will diversify the parts ; and, if properly disposed, neither in a confused crowd nor in a formal succession, will not encumber the view.

A RIVER requires a number of *accompaniments*. The

changes in its course furnish a variety of situations ; while the fertility, convenience, and amenity, which attend it, account for all appearances of inhabitants and improvement. Profusion of ornament on a fictitious river, is a just imitation of cultivated nature. Every species of building, every stile of plantation, may abound on the banks ; and whatever be their characters, their proximity to the water is commonly the happiest circumstance in their situation. A lustre is from thence diffused on all around ; each derives an importance from its relation to this capital feature : those which are near enough to be reflected, immediately belong to it ; those at a greater distance still share in the animation of the scene ; and objects totally detached from each other, being all attracted towards the same interesting connexion, are united into one composition.

In the front of Blenheim was a deep broad valley, which abruptly separated the cattle from the lawn and the plantations before it ; even a direct approach could not be made, without building a monstrous bridge over the vast hollow : but this forced communication was only a subject of railery ; and the scene continued broken into two parts, absolutely distinct from each other. This valley has been lately flooded : it is not filled ; the bottom only is covered with water : the sides are still very high ; but they are no longer the steep slopes of a chasm, they are the bold shores of a noble river. The same bridge is standing without alteration : but no extravagance remains ; the water gives it propriety. Above it the river first appears, winding from behind a small thick wood, in the valley ; and soon taking a determined course, it is then broad enough to admit an island filled with the finest trees : others, corresponding to them in growth and disposition, stand in groups on the banks, intermixed with younger plantations. Immediately below the bridge, the river spreads into a large expanse : the sides are open lawn. On that forthright from the house formerly stood the palace of Henry the Second, celebrated in many an ancient ditty by the name of Fair Rosamond's Bower. A little clear spring, which rises there, is by the country people still called Fair Rosamond's Well. The spot is now marked by a single willow. Near it, is a fine collateral stream, of a beautiful form, retaining its breadth as far as it is seen, and retiring at last behind a hill from the view. The main river, having received this accession, makes a gentle bend ; then continues for a considerable length in one wide direct reach ; and, just as it disappears, throws itself down a high cascade, which is the present termination. On one of the banks of this reach is the garden : the steep is there diversified with thickets and with glades ; but the covert prevails, and the top is crowned with lofty trees. On the other side is a noble hanging wood in the park : it was depreciated when it sunk into a hollow, and was poorly lost in the bottom ; but it is now a rich appendage to the river, falling down an easy slope quite to the water's edge, where, without overshadowing, it is reflected on the surface. Another face of the same wood borders the collateral stream, with an outline more indented and various ; while a very large irregular clump adorns the opposite declivity. This clump is at a considerable distance from the principal river : but the stream is

Section III.
WATER.

34
Accompaniments on the banks.

35
Description of the water at Blenheim.

Section III.
WATER.

Section I.
WATER.

belongs to, brings it down to connect with the rest; and the other objects, which were before dispersed, are now, by the interest of each in a relation which is common to all, collected into one illustrious scene. The castle is itself a prodigious pile of building; which, with all the faults in its architecture, will never seem less than a truly princely habitation; and the confined spot where it was placed, on the edge of an abyss, is converted into a proud situation, commanding a beautiful prospect of water, and open to an extensive lawn, adequate to the mansion, and an emblem of its domain. In the midst of this lawn stands a column, a lately trophy, recording the exploits of the Duke of Marlborough, and the gratitude of Britain. Between this pillar and the castle is the bridge, which now, applied to a subject worthy of it, is established in all the importance due to its greatness. The middle arch is wider than the Rialto, but not too wide for the occasion; and yet this is the narrowest part of the river: but the length of the reaches is every where proportioned to their breadth: each of them is alone a noble piece of water: and the last, the finest of all, loses itself gradually in a wood, which, on that side, is also the boundary of the lawn, and rises into the horizon. All is great in the front of Blenheim: but in that vast space no void appears; so important are the parts, so magnificent the objects. The plain is extensive, the valley is broad, the wood is deep. Tho' the intervals between the buildings are large, they are filled with the grandeur which buildings of such dimensions and so much pomp diffuse all around them; and the river, in its long varied course, approaching to every object, and touching upon every part, spreads its influence over the whole. Notwithstanding their distances from each other, they all seem to be assembled about the water, which is every where a fine expanse, whose extremities are undetermined. In size, in form, and in style, it is equal to the majesty of the scene; and is designed in the spirit, is executed with the liberality, of the original donation, when this residence of a mighty monarch was bestowed by a great people, as a munificent reward on the hero who had deserved best of his country.

35
Of a river
flowing
through a
wood.

In the composition of this scene, the river, both as a part itself, and as uniting the other parts, has a principal share. But water is not lost, though it be in so confined or so concealed a spot as to enter into no view; it may render that spot delightful. It is capable of the most exquisite beauty in its form; and though not in space, may yet in disposition have pretensions to greatness: for it may be divided into several branches, which will form a cluster of islands all connected together, make the whole place irriguous, and, in the stead of extent, supply a quantity of water. Such a sequestered scene usually owes its retirement to the trees and the thickets with which it abounds; but in the disposition of them, one distinction should be constantly attended to. A river flowing through a wood which overpreads one continued surface of ground, and a river between two woods, are in very different circumstances. In the latter case, the woods are separate; they may be contrasted in their forms and their characters, and the outline of each should be forcibly marked. In the former, no outline ought to be discernible; for the river passes between trees, not

between boundaries; and though, in the progress of its course, the style of the plantations may be often changed, yet on the opposite banks a similarity should constantly prevail, that the identity of the wood may never be doubtful.

A river between two woods may enter into a view; and then it must be governed by the principles which regulate the conduct and the accompaniments of a river in an open exposure. But, when it runs through a wood, it is never to be seen in prospect: the place is naturally full of obstructions; and a continued opening, large enough to receive a long reach, would seem an artificial cut. The river must therefore necessarily wind more than in crossing a lawn, where the passage is entirely free; but its influence will never extend so far on the sides: the buildings must be near the banks; and, if numerous, will seem crowded, being all in one track, and in situations nearly alike. The scene, however, does not want variety: on the contrary, none is capable of more. The objects are not indeed so different from each other as in an open view; but they are very different, and in much greater abundance; for this is the interior of a wood, where every tree is an object, every combination of trees a variety, and no large intervals are requisite to distinguish the several dispositions; the grove, the thicket, or the groupes, may prevail, and their forms and their relations may be constantly changed, without restraint of fancy, or limitation of number.

Water is so universally and so deservedly admired in a prospect, that the most obvious thought in the management of it, is to lay it as open as possible, and purposely to conceal it would generally seem a severe self-denial: yet so many beauties may attend its passage through a wood, that larger portions of it might be allowed to such retired scenes, than are commonly spared from the view, and the different parts in different styles would be fine contrasts to each other. If the water at Wotton were all exposed, a walk of near two miles along the banks would be of a tedious length, from the want of those changes of the scene, which now supply through the whole extent a succession of Grenville's perpetual variety. That extent is so large as to admit of a division into four principal parts, all of them great in style and in dimensions, and differing from each other both in character and situation. The two first are the least. The one is a reach of a river, about the third of a mile in length, and of a competent breadth, flowing through a lovely mead, open in some places to views of beautiful hills in the country, and adorned in others with clumps of trees, so large, that their branches stretch quite across, and form a high arch over the water. The next seems to have been once a formal basin, encompassed with plantations, and the appendages on either side still retain some traces of regularity; but the shape of the water is free from them: the size is about 14 acres; and out of it issue two broad collateral streams, winding towards a large river, which they are seen to approach, and supposed to join. A real junction is however impossible, from the difference of the levels; but the terminations are so artfully concealed, that the deception is never suspected, and when known is not easily explained. The river is the third great division of the water; a lake into which it falls, is the fourth. These two do actually

36
Description
of the water
at Wotton,
(the seat of Mr.
Grenville)
in the vale of
Aylesbury,
Buckinghamshire.

usually join: but their characters are directly opposite; the scenes they belong to are totally distinct; and the transition from the one to the other is very gradual: for an island near the conflux, dividing the breadth, and concealing the end of the lake, moderates for some way the space; and permitting it to expand but by degrees, raises an idea of greatness, from uncertainty accompanied with increase. The reality does not disappoint the expectation; and the island, which is the point of view, is itself equal to the scene: it is large, and high above the lake; the ground is irregularly broken; thickets hang on the sides; and towards the top is placed an Ionic portico, which commands a noble extent of water, not less than a mile in circumference, bounded on one side with wood, and open on the other to two sloping lawns, the least of an hundred acres, diversified with clumps, and bordered by plantations. Yet this lake, when full in view, and with all the importance which space, form, and situation can give, is not more interesting than the sequestered river, which has been mentioned as the third great division of the water. It is just within the verge of a wood, three quarters of a mile long, every where broad, and its course is such as to admit of infinite variety without any confusion. The banks are cleared of underwood; but a few thickets still remain, and on one side an impenetrable covert soon begins: the interval is a beautiful grove of oaks, scattered over a green sward of extraordinary verdure. Between these trees and these thickets the river seems to glide gently along, constantly winding, without one short turn, or one extended reach, in the whole length of the way. This even temper in the stream suits the scenes through which it passes; they are in general of a very sober cast; not melancholy, but grave; never exposed to a glare; never darkened with gloom; nor, by strong contrasts of light and shade, exhibiting the excess of either. Undisturbed by an extent of prospects without, or a multiplicity of objects within, they retain at all times a mildness of character; which is still more forcibly felt when the shadows grow faint as they lengthen, when a little rustling of birds in the spray, the leaping of the fish, and the fragrant of the woodbine, denote the approach of evening; while the setting sun shoots its last gleams on a Tuscan portico, which is close to the great basin, but which from a seat near this river is seen at a distance, through all the obscurity of the wood glowing on the banks, and reflected on the surface of the water. In another still more distinguished spot is built an elegant bridge, with a colonnade upon it, which not only adorns the place where it stands, but is also a picturesque object to an octagon building near the lake, where it is shewn in a singular situation, over-arched, encompassed, and backed with wood, without any appearance of the water beneath. This building in return is also an object from the bridge; and a Chinese room, in a little island just by, is another: neither of them are considerable, and the others which are visible are at a distance, but more or greater adventitious ornaments are not required in a spot so rich as this in beauties peculiar to its character. A profusion of water pours in from all sides round upon the view; the opening of the lake appears; a glimpse is caught of the large basin; one of the collateral streams is full in sight, and the

bridge itself is in the midst of the finest part of the river: all seem to communicate the one with the other. Though thickets often intercept, and groupes perplex, the view, yet they never break the connection between the several pieces of water: each may still be traced along large branches, or little catches; which in some places are over-shadowed and dim; in others glitten through a glade, or glimmer between the boles of trees in a distant perspective; and in one, where they are quite lost to the view, some arches of a stone-bridge, but partially seen among the wood, preserve their connection. However interrupted, however varied, they still appear to be parts of one whole, which has all the intricacy of number, and the greatness of unity; the variety of a stream, and the quantity of a lake; the solemnity of a wood, and the animation of water.

If a large river may sometimes, a smaller current undoubtedly may often, be conducted through a wood: it seldom adorns, it frequently disfigures a prospect, where its course is marked, not by any appearance of water, but by a confused line of clotted grass, which disagrees with the general verdure. A rivulet may, indeed, have consideration enough for a home scene, though it be open; but a rill is always most agreeable when most retired from public view. Its characteristic excellencies are vivacity and variety, which require attention, leisure, and silence, that the eye may pore upon the little beauties, and the ear listen to the low murmurs of the stream without interruption. To such indulgence a confined spot only is favourable; a close copse is, therefore, often more acceptable than a high wood, and a sequestered valley at all times preferable to any open exposure: a single rill at a very little distance is a mere water-course; it loses all its charms; it has no importance in itself, and bears no proportion to the scene. A number of little streams have, indeed, an effect in any situation, but not as objects; they are interesting only on account of the character they express, the irrisuous appearance which they give to the whole.

The full tide of a large river has more force than activity, and seems too unwieldy to allow of very quick transitions. But in a rill, the agility of its motion accounts for every caprice: frequent windings disguise its insignificance: short turnings shew its vivacity: sudden changes in the breadth are a species of its variety: and however fantastically the channel may be wreathed, contracted, and widened, it still appears to be natural. We find an amusement in tracing the little stream through all the intricacies of its course, and in seeing it force a passage through a narrow freight, expatiate on every opportunity, struggle with obstructions, and puzzle out its way. A rivulet, which is the mean betwixt a river and a rill, partakes of the character of both: it is not licensed to the extravagance of the one, nor under the same restraints as the other: it may have more frequent bends than the river; longer reaches than a rill: the breadth of a stream determines whether the principal beauty results from extent or from variety.

The murmurs of a rill are amongst the most pleasing circumstances which attend it. If the bed of the stream be rough, mere declivity will occasion a constant rippling noise: when the current drops down a

37
Of a rill and
a rivulet.

Section III.
WATER.Section IV.
ROCKS.

descent, though but of a few inches, or forcibly bubbles up from a little hollow, it has a deep gurgling tone, not uniformly continued, but incessantly repeated, and therefore more engaging than any. The flattest of all, is that found rather of the splashing than the fall of water, which an even gentle slope, or a tame obdruftion, will produce: this is less pleasing than the others; but none should be entirely excluded: all in their turns are agreeable; and the choice of them is much in our power: by observing their causes, we may often find the means to strengthen, to weaken, or to change them; and the addition or removal of a single stone, or a few pebbles, will sometimes be sufficient for the purpose.

39
Of cascades.

A rill cannot pretend to any sound beyond that of a little water-fall: the roar of a cascade belongs only to larger streams; but it may be produced by a rivulet to a considerable degree, and attempts to do more have generally been unsuccessful. A vain ambition to imitate nature in her great extravagancies betrays the weakness of art. Though a noble river, throwing itself headlong down a precipice, be an object truly magnificent, it must however be confessed, that in a single sheet of water there is a formality, which its vastness alone can cure; but the height, not the breadth, is the wonder: when it falls no more than a few feet, the regularity prevails; and its extent only serves to expose the vanity of affecting the style of a cataract in an artificial cascade. It is less exceptionable if divided into several parts: for then each separate part may be wide enough for its depth; and in the whole, variety, not greatness, will be the predominant character. But a structure of rough, large, detached stones, cannot easily be contrived of strength sufficient to support a great weight of water: it is sometimes from necessity almost smooth and uniform; and then it loses much of its effect: several little falls in succession are preferable to one great cascade which in figure or in motion approaches to regularity.

When greatness is thus reduced to number, and length becomes of more importance than breadth, a rivulet vies with a river; and it more frequently runs in a continued declivity, which is very favourable to such a succession of falls. Half the expence and labour which are sometimes bestowed on a river, to give it, at the best, a forced precipitancy, in one spot only, would animate a rivulet through the whole of its course: and, after all, the most interesting circumstance in falling waters is their animation. A great cascade fills us with surprise: but all surprise must cease; and the motion, the agitation, the rage, the froth, and the variety of the water, are finally the objects which engage the attention: for these a rivulet is sufficient; and they may there be produced without that appearance of effort which raises a suspicion of art.

To obviate such a suspicion, it may be sometimes expedient to begin the descent out of sight; for the beginning is the difficulty: if that be concealed, the subsequent falls seem but a consequence of the agitation which characterises the water at its first appearance; and the imagination is, at the same time, left loose to give ideal extent to the cascades. When a stream issues from a wood, such management will have a great effect: the bends of its course in an open expanse may afford frequent opportunities for it; and sometimes a

low broad bridge may furnish the occasion: a little fall hid under the arch will create a disorder; in consequence of which, a greater cascade below will appear very natural.

SECT. IV. Of Rocks.

RILLS, rivulets, and cascades, abound among rocks: they are natural to the scene; and such scenes commonly require every *accompaniment* which can be procured for them. Mere rocks, unless they are peculiarly adapted to certain impressions, may surprise, but can hardly please: they are too far removed from common life, too barren, and inhospitable; rather desolate than solitary, and more horrid than terrible. So austere a character cannot be long engaging, if its rigour be not softened by circumstances which may belong either to these or to more cultivated spots: and when the dreariness is extreme, little streams and water-falls are of themselves insufficient for the purpose; an intermixture of vegetation is also necessary, and on some occasions even marks of inhabitants are proper.

Middleton-dale is a cleft between rocks, ascending gradually from a romantic village, till it emerges, at about two miles distance, on the vast moor-lands of the Peake. It is a dismal entrance to a desert: the hills above it are bare; the rocks are of a grey colour; their surfaces are rugged, and their shapes savage; frequently terminating in craggy points, sometimes resembling vast unwieldy bulwarks, or rising in heavy buttresses one above another; and here and there a misshapen mass bulging out hangs lowering over its base. No traces of men are to be seen, except in a road which has no effect on such a scene of desolation, and in the lime-kilns constantly smoking on the side; but the labourers who occasionally attend them live at a distance; there is not a hovel in the dale; and some scanty withering bushes are all its vegetation: for the soil between the rocks produces as little as they do; it is disfigured with all the tinges of brown and red, which denote barrenness; in some places it has crumbled away, and strata of loose dark stones only appear; and in others, long lines of drofs and rubbish shoveled out of mines, have fallen down the steep. In these mines, the veins of lead on one side of the dale, are observed always to have corresponding veins, in exactly the same direction, on the other: and the rocks, though differing widely in different places, yet always continue in one style for some way together, and seem to have a relation to each other. Both these appearances make it probable, that Middleton-dale is a chasm rent in the mountain by some convulsion of nature, beyond the memory of man, or perhaps before the island was peopled: the scene, though it does not prove the fact, yet justifies the supposition; and it gives credit to the tales of the country people, who, to aggravate its horrors, always point to a precipice, down which they say that a poor girl of the village threw herself headlong, in despair, at the neglect of the man whom she loved; and shew a cavern, where a skeleton was once discovered, and of what wretch is unknown, his bones were the only memorial left of him. All the dreariness however of the place, which accords so well with such traditions, abates upon the junction of another valley, the sides of which are still of rock, but mixed and crowned with fine wood; and Middleton-dale becomes

39
Of the accompaniments of rocks.40
Description of Middleton-dale, (near Chatsworth.)

more

more mild by sharing in its beauties : near this junction a clear stream issues from under the hill, and runs down the dale, receiving as it proceeds many rills and springs, all as transparent as itself. The principal rivulet is full of little water-falls : they are sometimes continued in succession along a reach of considerable length, which is whitened with froth all the way ; at other times the brook wreathes in frequent windings, and drops down a step at every turn ; or slopes between tufts of grass, in a brisk, though not a precipitant descent ; when it is most quiet, a thousand dimples still mark its vivacity ; it is every where active, sometimes rapid, seldom silent, but never furious or noisy : the first impressions which it makes are of sprightliness and gaiety, very different from those which belong to the scene all around ; but by dwelling upon both, they are brought nearer together ; and a melancholy thought occurs, that such a stream should be lost in watering a walle ; the wilderness appears more forlorn which to much vivacity cannot enliven ; as the idea of desolation is heightened by reflecting that the

Flower is born to blith unseen,
And waste its sweetness on the desert air ;
and that

The nightingale attunes her notes,
Where none are left to hear.

If such a scene occurs within the precincts of a park or a garden, no expense should be spared to meliorate the soil, wherever any soil can be found. Without some vegetation among the rocks, they are only an object of curiosity, or a subject of wonder : but verdure alone will give some relief to the dreariness of the scene ; and shrubs or bushes, without trees, are a sufficiency of wood : the thickets may also be extended by the creeping plants, such as pyracantha, vines, and ivy, to wind up the sides, or cluster on the tops of the rocks. And to this vegetation may be added some symptoms of inhabitants, but they must be slight and few : the use of them is only to cheer, not to destroy, the solitude of the place ; and such therefore should be chosen as are sometimes found in situations retired from public resort ; a cottage may be lonely, but it must not here seem ruinous and neglected ; it should be tight and warm, with every mark of comfort about it, to which its position in some sheltered recess may greatly contribute. A cavity also in the rocks, rendered easy of access, improved to a degree of convenience, and maintained in a certain state of preservation, will suggest similar ideas of protection from the bitterest inclemencies of the sky, and even of occasional refreshment and repose. But we may venture still further : a mill is of necessity often built at some distance from the town which it supplies ; and here it would at the same time apply the water to a use, and increase its agitation. The dale may besides be made the haunt of those animals, such as goats, which are sometimes wild, and sometimes domestic ; and which accidentally appearing, will divert the mind from the sensations, natural to the scene, but not agreeable if continued long without interruption. These and such other expedients will approximate the severest retreat to the habitations of men, and convert the appearance of a perpetual banishment into that of a temporary retirement from society.

But too strong a force on the nature of the place al-

ways fails. A winding-path, which appears to be worn, not cut, has more effect than a high road, all artificial and level, which is too weak to overbear, and yet contradicts, the general idea. The objects therefore to be introduced must be those which hold a mean between solitude and population ; and the inclination of that choice towards either extreme, should be directed by the degree of wildness which prevails : for tho' that runs sometimes to an excess which requires correction, at other times it wants encouragement, and at all times it ought to be preferred : it is the predominant character of rocks, which mixes with every other, and to which all the appendages must be accommodated ; and they may be applied to as greatly to increase it : a licentious irregularity of wood and of ground, and a fantastic conduct of the streams, neither of which would be tolerated in the midst of cultivation, become and improve romantic spots ; even buildings, partly by their style, but still more by their position, in strange, difficult, or dangerous situations, distinguishing and aggravate the native extravagancies of the scene.

In the choice and the application of these accompaniments, consists all our power over rocks ; they are themselves too vain and too stubborn to submit to our controul ; but by the addition or removal of appendages, which we can command, parts may be shewn or concealed, and the characters with their impressions may be weakened or enforced : to adapt the accompaniments accordingly, is the utmost ambition of art when rocks are the subject.

Their most distinguished characters are, *dignity, terror, and fancy* : the expressions of all are constantly wild : and sometimes a rocky scene is only wild, without pretensions to any particular character.

THAT which inspires ideas of greatness, as distinguished from those of terror, has less wildness in it than any. There is a composure in dignity, which is disconcerted by quick transitions and the flutter of variety. A succession, therefore, of nearly the same forms, a repetition of them one above the other, do not derogate from an effect, which depends more on the extent than the changes of the scene : the dimensions which are necessary to produce that effect, contract the room for variety ; the parts must be large : if the rocks are only high, they are but stupendous, not majestic ; breadth is equally essential to their greatness ; and every slender, every grotesque shape, is excluded.

Art may interpose to shew these large parts to the eye, and magnify them to the imagination, by taking away thickets which stretch quite across the rocks, so as to disguise their dimensions ; or by filling with wood the small intervals between them, and thus, by concealing the want, preserving the appearance of continuation.

When rocks retire from the eye down a gradual declivity, we can, by raising the upper ground, deepen the fall, lengthen the perspective, and give both height and extent to those at a distance : this effect may be still increased by covering that upper ground with a thicket, which shall cease, or be lowered, as it descends.

A thicket, on other occasions, makes the rocks which rise out of it seem larger than they are. If they stand upon a bank overpread with shrubs, their beginning is at the least uncertain ; and the presumption is,

18 K 2 that

42
Of rocks
characteri-
sed by dig-
nity.

Section IV. that they start from the bottom.

ROCKS.

Another use of this brushy underwood is to conceal the fragments and rubbish which have fallen from the sides and the brow, and which are often unsightly. Rocks are seldom remarkable for the elegance of their forms; they are too vast, and too rude, to pretend to delicacy: but their shapes are often agreeable; and we can affect those shapes to a certain degree, at least we can cover many blemishes in them, by conducting the growth of shrubby and creeping plants about them.

For all these purposes mere underwood suffices: but for greater effects larger trees are requisite: they are worthy of the scene; and not only improvements, but accessions to its grandeur: we are used to rank them among the noblest objects of nature; and when we see that they cannot aspire to the midway of the heights around them, the rocks are raised by the comparison. A single tree is, therefore, often preferable to a clump: the size, though really less, is more remarkable: and clumps are besides generally exceptionable in a very wild spot, from the suspicion of art which attends them; but a wood is free from that suspicion, and its own character of greatness recommends it to every scene of magnificence.

On the same principle, all the consideration which can be, should be given to the streams. No number of little rills are equal to one broad river; and in the principal current, some varieties may be sacrificed to importance: but a degree of strength should always be preserved: the water, though it needs not be furious, should not be dull; for dignity, when most serene, is not languid; and space will hardly atone for want of animation.

The character, however, of greatness, when divested of terror, is placid. It does not, therefore, exclude marks of inhabitants, though it never requires them to tame its wildness: and without inviting, it occasionally admits an intermixture of vegetation. It even allows of buildings intended only to decorate the scene: but they must be adequate to it, both in size and in character. And if cultivation is introduced, that too should be conformable to the rest: not a single narrow patch cribbed out of the waste; but the confines of a country shelving into the vale, and suggesting the idea of extent: nothing trivial ought to find admittance. But, on the other hand, the character is not violated by a mixture of agreeableness with its grandeur; and far less is extravagance required to support it: strange shapes in extraordinary positions, enormous weights unaccountably sustained, trees rooted in the sides, and torrents raging at the foot of the rocks, are, at the best, needless excesses. There is a temperance in dignity, which is rather hurt by a wanton violence on the common order of nature. Great objects alone, great in their dimensions and in their style, are amply sufficient to satisfy and to fill the mind: when these fail, then, and then only, we are apt to have recourse to wonder, in order to excite admiration.

Many of the circumstances which have been mentioned concur at Matlock Bath, which is situated in a vale near three miles long, shut up at one end by a rising moor, and at the other end by vast cliffs of rock: the entrance into it is hewn through one of them, and is indeed a noble rude portal to a scene of romantic

magnificence. One side of the valley is a very high range of hill, rough with bushes, and great blocks or ledges of stone. The other side is washed by the Derwent, and consists chiefly of rocks; which, however, are often interrupted by steep declivities of green sward, large thickets, and gentle descents of fine fields from the adjacent country. The rocks sometimes form the brow, sometimes they fix the foot, and sometimes they break the sides, of the hill. At the high Tor they are 123 yards above the water: in other places they are no more than an abrupt bank of a few feet to the river: for the most part they are nearly perpendicular, falling in several stages, or in one vast precipice, from the top to the bottom. But though similar in shape, they are widely different in their construction: in one place they are irregularly jointed, in another, more uniformly ribbed, in a third they form a continued surface from the summit to the base, and frequently they are composed of enormous masses of stone heaped upon each other. From some such scene probably was conceived the wild imagination in ancient mythology of the giants piling Pelion upon Ossa: in this, all is vast; height, breadth, solidity, boldness of idea, and unity of style, combine to form a character of greatness, consistent throughout, not uniform, unmixed with any littleness, unallayed with any extravagance. The colour of the rocks is almost white; and their splendour is enhanced in many places by ivy and single yew-trees appearing amongst them: the intervals between them are generally filled with a brushy underwood, which diversifies and embellishes the scene very beautifully, but for want of large trees adds nothing to its grandeur; there are few of any note through out the vale: the best are in a small wood near the bath; but they are not adequate to the objects around them, to the steepness of the hill, the loftiness of the rocks, and the character of the Derwent. That character is, indeed, rather too strong for the place: in size, and in the direction of its course, the river is exactly such as might be wished; but it is a torrent, in which force and fury prevail: the cascades in it are innumerable; before the water is recovered from one fall, it is hurried down another; and its agitation being thus increased by repeated shocks, it pushes on with restless violence to the next, where it dashes against fragments of rocks, or foams among heaps of stones which the stream has driven together. The colour all along is of a reddish brown; even the foam is tinged with a dusky hue: and where there are no cascades, still the declivity of the bed preserves the rapidity, and a quantity of little breakers continue the turbulence of the current. Many of these circumstances are certainly great: but a more temperate river, rolling its full tide along with strength and activity, without rage; falling down one noble cascade, instead of many; and if animated sometimes by resistance, yet not constantly struggling with obstructions; would have been more consistent with the sedate steady dignity of these noble piles of rock, whose brightness, together with the verdure of a vigorous and luxuriant, though humble vegetation, and some appearances of culture, give to the whole an air of cheerful serenity, which is disturbed by the impetuosity of the Derwent.

This river would be better suited to a scene characterized by that terror, which the combination of greatness with force inspires, and which is animating and in-

43
Description
of Matlock
Bath, (in
Derby-
shire.)

43
Of rocks
character-
ized by ter-
ror.

interesting, from the exertion and anxiety attending it. The terrors of a scene in nature are like those of a dramatic representation: they give an alarm; but the sensations are agreeable, so long as they are kept to such as are allied only to terror, unmixed with any that are horrible and disgusting. Art may therefore be used to heighten them, to display the objects which are distinguished by greatness, to improve the circumstances which denote force, to mark those which intimate danger, and to blend with all here and there a cast of melancholy.

Greatness is as essential to the character of terror as to that of dignity: vast efforts in little objects are but ridiculous; nor can force be supposed upon trifles incapable of resistance. On the other hand, it must be allowed, that exertion and violence supply some want of space. A rock wonderfully supported, or threatening to fall, acquires a greatness from its situation, which it has not in dimensions; so circumstanced, the size appears to be monstrous: a torrent has a consequence which a placid river of equal breadth cannot pretend to: and a tree, which would be inconsiderable in the natural soil, becomes important when it bursts forth from a rock.

Such circumstances should be always industriously sought for; it may be worth while to cut down several trees, in order to exhibit one apparently rooted in the stone. By the removal perhaps of only a little brush-wood, the alarming disposition of a rock, strangely undermined, rivetted, or suspended, may be shewn; and if there be any soil above its brow, some trees planted there, and impending over it, will make the object still more extraordinary. As to the streams, great alterations may generally be made in them: and therefore it is of use to ascertain the species proper to each scene, because it is in our power to enlarge or contract their dimensions; to accelerate or retard their rapidity; to form, increase, or take away obstructions; and always to improve, often to change, their characters.

Inhabitants furnish frequent opportunities to strengthen the appearances of force, by giving intimations of danger. A house placed at the edge of a precipice, any building on the pinnacle of a crag, makes that situation seem formidable, which might otherwise have been unnoticed: a steep, in itself not very remarkable, becomes alarming, when a path is carried almost up the side: a rail on the brow of a perpendicular fall, shews that the height is frequented and dangerous: and a common foot-bridge thrown over a cleft between rocks has a still stronger effect. In all these instances, the imagination immediately transports the spectator to the spot, and suggests the idea of looking down such a depth: in the last, that depth is a chasm, and the situation is directly over it.

In other instances, exertion and danger seem to attend the occupations of the inhabitants:

—Half way down

Hangs one that gathers sapphires; dreadful trade!

is a circumstance chosen by the great master of nature, to aggravate the terrors of the scene he describes. Mines are frequent in rocky places: and they are full of ideas suited to such occasions. To these may sometimes be added the operations of engines: for machinery, especially when its powers are stupendous or its effects formidable, is an effort of art which may be ac-

commodated to the extravagancies of nature.

A scene at the New Weir on the Wye, which in itself is truly great and awful, so far from being disturbed, becomes more interesting and important, by the business to which it is destined. It is a chasm between two high ranges of hill, which rise almost perpendicularly from the water; the rocks on the sides are mostly heavy masses, and their colour is generally brown: but here and there a pale craggy shape starts up to a vast height above the rest, unconnected, broken, and bare: large trees frequently force out their way amongst them: and many of them stand far back in the covert, where their natural dusky hue is deepened by the shadow which overhangs them. The river too, as it retires, loses itself in woods, which close immediately above, then rise thick and high, and darken the water. In the midst of all this gloom is an iron forge, covered with a black cloud of smoke, and surrounded with half-burned ore, with coal, and with cinders: the fuel for it is brought down a path, worn into steps narrow and steep, and winding among precipices: and near it is an open space of barren moor, about which are scattered the huts of the workmen. It stands close to the cascade of the Weir; where the agitation of the current is increased by large fragments of rocks, which have been swept down by floods from the banks, or shivered by tempests from the brow: and the sudden found, at stated intervals, from the strokes of the great hammers in the forge, deadens the roar of the waterfall. Just below it, while the rapidity of the stream still continues, a ferry is carried across it: and lower down the fishermen use little round boats, called *truckles*, the remains, perhaps, of the ancient British navigation, which the least motion will overset, and the slightest touch may destroy. All the employments of the people seem to require either exertion or caution: and the ideas of force or of danger which attend them, give to the scene an animation unknown in a solitary, though perfectly compatible with the wildest romantic situations.

But marks of inhabitants must not be carried to the length of cultivation, which is too mild for the ruggedness of the place, and has besides an air of cheerfulness inconsistent with the character of terror: a little inclination towards melancholy is generally acceptable, at least to the exclusion of all gaiety; and beyond that point, so far as to throw just a tinge of gloom upon the scene. For this purpose, the objects whose colour is obscure should be preferred; and those which are too bright may be thrown into shadow: the wood may be thickened, and the dark greens abound in it: if it is necessarily thin, yews and shabby firs should be scattered about it: and sometimes to shew a withering or a dead tree, it may for a space be cleared entirely away. All such circumstances are acquisitions, if they can be had without detriment to the principal character: for it must ever be remembered, that where terror prevails, melancholy is but a secondary consideration.

The different species of rocks often meet in the same place, and compose a noble scene, which is not distinguished by any particular character: it is only when one eminently prevails, that it deserves such a preference as to exclude every other. Sometimes a spot, remarkable for nothing but its wildness, is highly romantic: and when this wildness rises to fancy, when

Section IV.
ROCKS.

46
Description
of Dove-
dale, (near
Alhbourne
in Derby-
shire.)

the most singular, the most opposite forms and combinations are thrown together, then a mixture also of several characters adds to the number of instances which there concur to display the inexhaustible variety of nature.

So much variety, so much fancy, are seldom found within the same extent as in Dove-dale. It is about two miles in length, a deep, narrow, hollow valley: both the sides are of rock; and the Dove in its passage between them is perpetually changing its course, its motion, and appearance. It is never less than ten, nor so much as twenty yards wide, and generally about four feet deep; but transparent to the bottom, except when it is covered with a foam of the purest white; under water-falls which are perfectly lucid. These are very numerous, but very different. In some places they stretch straight across, or assant the stream: in others, they are only partial; and the water either dashes against the stones, and leaps over them, or, pouring along a steep, rebounds upon those below; sometimes it rushes through the several openings between them; sometimes it drops gently down; and at other times it is driven back by the obstruction, and turns into an eddy. In one particular spot, the valley almost closing, leaves hardly a passage for the river, which pent up, and struggling for a vent, rages and roars and foams, till it has extricated itself from the confinement. In other parts, the stream, though never languid, is often gentle; flows round a little desert island, glides between bits of bulrushes, disperses itself among tufts of grass or of moss, bubbles about a water-dock, or plays with the slender threads of aquatic plants which float upon the surface. The rocks all along the dale vary as often in their structure, as the stream in its motion. In one place, an extended surface gradually diminishes from a broad base almost to an edge; in another, a heavy top hanging forwards, overhangs all beneath: sometimes many different shapes are confusedly tumbled together; and sometimes they are broken into slender sharp pinnacles, which rise upright, often two or three together, and often in more numerous clusters. On this side of the dale, they are universally bare; on the other, they are intermixed with wood; and the vast height of both the sides, with the narrowness of the interval between them, produces a further variety: for whenever the sun shines from behind the one, the form of it is distinctly and completely cast upon the other; the rugged surface on which it falls diversifies the tints; and a strong reflected light often glares on the edge of the deepest shadow. The rocks never continue long in the same figure or situation, and are very much separated from each other: sometimes they form the sides of the valley, in precipices, in steep, or in stages; sometimes they seem to rise in the bottom, and lean back against the hill; and sometimes they stand out quite detached, heaving up in cumbrous piles, or starting into conical shapes, like vast spars, an 100 feet high; some are firm and solid throughout, some are cracked, and some, split and undermined, are wonderfully upheld by fragments apparently unequal to the weight they sustain. One is placed before, one over another, and one fills, at some distance behind, an interval between two. The changes in their disposition are infinite; every step produces some new combination;

they are continually crossing, advancing, and retiring: the breadth of the valley is never the same 40 yards together: at the narrow pafs which has been mentioned, the rocks almost meet at the top, and the sky is seen as through a chink between them: just by this gloomy abyss, is a wider opening, more light, more verdure, more cheerfulness, than any where else in the dale. Nor are the forms and the situations of the rocks their only variety: many of them are perforated by large natural cavities, some of which open to the sky, some terminate in dark recesses, and through some are to be seen several more uncouth arches, and rude pillars, all detached, and retiring beyond each other, with the light shining in between them, till a rock far behind them closes the perspective: the noise of the cascades in the river echoes amongst them; the water may often be heard at the same time gurgling near, and roaring at a distance; but no other sounds disturb the silence of the spot: the only trace of men is a blind path, but lightly and but seldom trodden, by those whose curiosity leads to see the wonders they have been told of Dove-dale. It seems, indeed, a fitter haunt for more ideal beings: the whole has the air of enchantment. The perpetual shifting of the scenes; the quick transitions, the total changes; then the forms all around, grotesque as chance can cast, wild as nature can produce, and various as imagination can invent; the force which seems to have been exerted to place some of the rocks where they are now fixed immovable, the magic by which others appear still to be suspended; the dark caverns, the illuminated recesses, the fleeting shadows, and the gleams of light glancing on the sides, or trembling on the stream; and the loneliness and the stillness of the place, all crowding together on the mind, almost realize the ideas which naturally present themselves in this region of romance and of fancy.

The solitude of such a scene is agreeable, on account of the endless entertainment which its variety affords, and in the contemplation of which both the eye and the mind are delighted to indulge: marks of inhabitants and cultivation would disturb that solitude; and ornamental buildings are too artificial in a place to absolutely free from restraint. The only accompaniments proper for it are wood and water; and by these sometimes improvements may be made. When two rocks similar in shape and position are near together, by skirting one of them with wood, while the other is left bare, a material distinction is established between them: if the streams be throughout of one character, it is in our power, and should be our aim, to introduce another. Variety is the peculiar property of the spot, and every accession to it is a valuable acquisition. On the same principle, endeavours should be used, not only to multiply, but to aggravate differences, and to increase distinctions into contrasts: but the subject will impose a caution against attempting too much. Art must almost despair of improving a scene, where nature seems to have exerted her invention.

SECT. V. Of Buildings.

BUILDINGS are the very reverse of rocks. They ⁴⁷ are absolutely in our power, both the species and the situation; and hence arises the excess in which they ^{often} often

Section IV.
BUILD-
INGS.

often abound. The desire of doing something, is stronger than the fear of doing too much: these may always be procured by expence, and bought by those who know not how to choose; who consider profusion as ornament, and confound by number instead of distinguishing by variety.

Buildings probably were first introduced into gardens merely for convenience, to afford refuge from a sudden shower, and shelter against the wind; or, at the most, to be seats for a party; or for retirement. They have since been converted into objects, and now the original use is too often forgotten in the greater purposes to which they are applied: they are considered as objects only; the inside is totally neglected, and a pompous edifice frequently wants a room barely comfortable. Sometimes the pride of making a lavish display to a visitor, without any regard to the owner's enjoyments, and sometimes too scrupulous an attention to the style of the structure, occasions a poverty and dulness within, which deprives the buildings of part of their utility. But in a garden they ought to be considered both as beautiful objects, and as agreeable retreats: if a character becomes them, it is that of the scene they belong to; not that of their primitive application. A Grecian temple or Gothic church, may adorn spots where it would be affectation to preserve that solemnity within, which is proper for places of devotion: they are not to be exact models, subjects only of curiosity or study; they are also seats: and such seats will be little frequented by the proprietor; his mind must generally be indisposed to so much simplicity, and so much gloom, in the midst of gaiety, richness, and variety.

But though the interior of buildings should not be disregarded, it is by their exterior that they become objects; and sometimes by the one, sometimes by the other, and sometimes by both, they are entitled to be considered as characters.

As objects, they are designed either to *distinguish*, or to *break*, or to *adorn*, the scenes to which they are applied.

The differences between one wood, one lawn, one piece of water, and another, are not always very apparent; the several parts of a garden would, therefore, often seem similar, if they were not distinguished by buildings: but these are so observable, so obvious at a glance, so easily retained in the memory, they mark the spots where they are placed with so much strength, they attract the relation of all around with so much power, that parts thus distinguished can never be confounded together. Yet it by no means follows, that therefore every scene must have its edifice: the want of one is sometimes a variety; and other circumstances are often sufficiently characteristic: it is only when these too nearly agree, that we must have recourse to buildings for differences: we can introduce, exhibit, or contrast them as we please: the most striking object is thereby made a mark of distinction; and the force of this first impression prevents our observing the points of resemblance.

The uniformity of a view may be broken by similar means, and on the same principle: when a wide heath, a dreary moor, or a continued plain, is in prospect, objects which catch the eye supply the want of variety: none are so effectual for this purpose as build-

ings. Plantations or water can have no very sensible effect, unless they are large or numerous, and almost change the character of the scene: but a small single building diverts the attention at once from the sameness of the extent; which it breaks, but does not divide; and diversifies, without altering, its nature. The design, however, must not be apparent. The merit of a cottage applied to this purpose, consists in its being free from the suspicion; and a few trees near it will both enlarge the object, and account for its position. Ruins are a hackneyed device immediately detected, unless their style be singular, or their dimensions extraordinary. The semblance of an ancient British monument might be adapted to the same end, with little trouble, and great success. The materials might be brick, or even timber plastered over, if stone could not easily be procured: whatever they were, the fallacy would not be discernible; it is an object to be seen at a distance, rude, and large, and in character agreeable to a wild open view. But no building ought to be introduced, which may not in reality belong to such a situation: no Grecian temples, no Turkish mosques, no Egyptian obelisks or pyramids; none imported from foreign countries, and unusual here. The apparent artifice would destroy an effect; which is so nice as to be weakened, if objects proper to produce it are displayed with too much ostentation; if they seem to be contrivances, not accidents; and the advantage of their position appear to be more laboured than natural.

But in a garden, where objects are intended only to adorn, every species of architecture may be admitted, from the Grecian down to the Chinese; and the choice is so free, that the mischief most to be apprehended, is an abuse of this latitude in the multiplicity of buildings. Few scenes can bear more than two or three; in some, a single one has a greater effect than any number: and a careless glimpse, here and there, of such as belong immediately to different parts, frequently enliven the landscape with more spirit than those which are indistinctly shewn. If the effect of a partial sight, or a distant view, were more attended to, many scenes might be filled, without being crowded; a greater number of buildings would be tolerated, when they seemed to be casual, not forced; and the animation, and the richness of the objects, might be had without pretence or display.

Too fond an ostentation of buildings, even of those which are principal, is a common error; and when all is done, they are not always shewn to the greatest advantage. Though their symmetry and their beauties ought in general to be distinctly and fully seen, yet an oblique is sometimes better than a direct view: and they are often less agreeable objects when entire, than when a part is covered, or their extent is interrupted; when they are bosomed in wood, as well as backed by it; or appear between the stems of trees which rise before or above them: thus thrown into perspective, thus grouped and accompanied, they may be as important as if they were quite exposed, and are frequently more picturesque and beautiful.

But a still greater advantage arises from this management, in connecting them with the scene: they are considerable, and different from all around them; inclined therefore to separate from the rest; and yet

they are sometimes still more detached by the pains taken to exhibit them: that very importance which is the cause of the distinction, ought to be a reason for guarding against the independence to which it is naturally prone, and by which an object, which ought to be a part of the whole, is reduced to a mere individual. An elevated is generally a noble situation. When it is a point or a pinnacle, the structure may be a continuation of the ascent; and on many occasions, some parts of the building may descend lower than others, and multiply the appearances of connection: but an edifice in the middle of an extended ridge, commonly seems naked alone, and imposed upon the brow, not joined to it. If wood, to accompany it, will not grow there, it had better be brought a little way down the declivity; and then all behind, above, and about it, are so many points of contact, by which it is incorporated into the landscape.

Accompaniments are important to a building; but they lose much of their effect, when they do not appear to be casual. A little mount just large enough for it: a small piece of water below, of no other use than to reflect it; and a plantation close behind, evidently placed there only to give it relief; are as artificial as the structure itself, and alienate it from the scene of nature into which it is introduced, and to which it ought to be reconciled. These appendages therefore should be so disposed, and so connected with the adjacent parts, as to answer other purposes, tho' applicable to this; that they may be bonds of union, not marks of difference; and that the situation may appear to have been chosen, at the most, not made, for the building.

In the choice of a situation, that which shews the building best ought generally to be preferred: eminence, relief, and every other advantage which can be, ought to be given to an object of so much consideration: they are for the most part desirable; sometimes necessary; and exceptionable only when, instead of rising out of the scene, they are forced into it, and a contrivance to procure them at any rate is avowed without any disguise. There are, however, occasions, in which the most tempting advantages of situation must be waved; the general composition may forbid a building in one spot, or require it in another; at other times, the interest of the particular groupe it belongs to, may exact a sacrifice of the opportunities to exhibit its beauties and importance; and at all times, the pretensions of every individual object must give way to the greater effect of the whole.

THE same structure which adorns as an object, may also be expressive as a character. Where the former is not wanted, the latter may be desirable: or it may be weak for one purpose, and strong for the other; it may be grave, or gay; magnificent, or simple; and, according to its style, may or may not be agreeable to the place it is applied to. But mere consistency is not all the merit which buildings can claim: their characters are sometimes strong enough to *determine, improve, or correct*, that of the scene; and they are so conspicuous, and so distinguished, that whatever force they have is immediately and sensibly felt. They are fit therefore to make a first impression; and when a scene is but faintly characterised, they give at once a cast which spreads over the whole, and which the weaker

parts concur to support, though perhaps they were not able to produce it.

Nor do they stop at fixing an uncertainty, or removing a doubt; they raise and enforce a character already marked: a temple adds dignity to the noblest, a cottage simplicity to the most rural, scenes; the lightness of a spire, the airiness of an open rotunda, the splendor of a continued colonnade, are less ornamental than expressive; others improve cheerfulness into gaiety, gloom into solemnity, and richness into profusion: a retired spot, which might have been passed unobserved, is noticed for its tranquillity, as soon as it is appropriated by some structure to retreat; and the most unfrequented place seems less solitary than one which appears to have been the haunt of a single individual, or even of a sequestered family, and is marked by a lonely dwelling, or the remains of a deserted habitation.

The means are the same, the application of them only is different, when buildings are used to correct the character of the scene; to enliven its dulness, mitigate its gloom, or to check its extravagance; and, on a variety of occasions, to soften, to aggravate, or to counteract, particular circumstances attending it. But care must be taken that they do not contradict too strongly the prevailing idea: they may lessen the dreariness of a waste, but they cannot give it amenity; they may abate horrors, but they will never convert them into graces; they may make a tame scene agreeable, and even interesting, not romantic; or turn solemnity into cheerfulness, but not into gaiety. In these, and in many other instances, they correct the character, by giving it an inclination towards a better, which is not very different; but they can hardly alter it entirely: when they are totally inconsistent with it, they are at the best nugatory.

The great effects which have been ascribed to buildings, do not depend upon those trivial ornaments and appendages, which are often too much relied on; such as the furniture of a hermitage, painted glass in a Gothic church, and sculpture about a Grecian temple; grotesque or bacchanalian figures to denote gaiety, and death's-heads to signify melancholy. Such devices are only descriptive, not expressive, of character; and must not be substituted in the stead of those superior properties, the want of which they acknowledge, but do not supply. They besides often require time to trace their meaning, and to see their application; but the peculiar excellence of buildings is, that their effects are instantaneous, and therefore the impressions they make are forcible. In order to produce such effects, the general style of the structure, and its position, are the principal considerations: either of them will sometimes be strongly characteristic alone; united, their powers are very great; and both are so important, that if they do not concur, at least they must not contradict one another. The colour also of the buildings is seldom a matter of indifference: that excessive brightness which is too indiscriminately used to render them conspicuous, is apt to disturb the harmony of the whole, sometimes makes them too glaring as objects, and is often inconsistent with their characters. When these essential points are secured, subordinate circumstances may be made to agree with them; and though minute, they may not

not be improper, if they are not affected; they frequently mark a correspondence between the outside and the inside of a building: in the latter they are not inconsiderable; they may there be observed at leisure, and there they explain in detail the character which is more generally expressed in the air of the whole.

To enumerate the several buildings which may be used for convenience, or distinction, as ornaments, or as characters, would lead us far from our subject into a treatise of architecture: for every branch of architecture furnishes, on different occasions, objects proper for a garden; and different species may meet in the same composition: no analogy exists between the age and the country whence they are borrowed, and the spot they are applied to, except in some particular instances; but, in general, they are naturalized to a place of the most improved cultivated nature by their effects: beauty is their life; and they are consistent with each other, if all are conformable to the style of the scene, proportioned to its extent, and agreeable to its character. On the other hand, varieties more than sufficient for any particular spot, enough for a very extensive view, may be found in every species; to each also belong a number of characters; the Grecian architecture can lay aside its dignity in a rustic building; and the caprice of the Gothic is sometimes not incompatible with greatness: our choice therefore may be confined to the variations of one species, or range through the contrails of many, as circumstances, taste, or other considerations, shall determine.

The choice of situations is also very free. Circumstances which are requisite to particular structures, may often be combined happily with others, and enter into a variety of compositions: even where they are appropriated, they may still be applied in several degrees, and the same edifice may thereby be accommodated to very different scenes. Some buildings which have a just expression when accompanied with proper appendages, have none without them; they may therefore be characters in one place, and only objects in another. On all these occasions, the application is allowable, if it can be made without inconsistency: a hermitage must not be close to a road; but whether it be exposed to view on the side of a mountain, or concealed in the depth of a wood, is almost a matter of indifference; that it is at a distance from public resort, is sufficient. A castle must not be sunk in a bottom; but that it should stand on the utmost pinnacle of a hill, is not necessary: on a lower knole, and backed by the rise, it may appear to greater advantage as an object, and be much more important to the general composition. A tower,

"Bosom'd high in tufted trees,"

has been selected by one of our greatest poets as a singular beauty; and the justness of his choice has been so generally acknowledged, that the description is become almost proverbial: and yet a tower does not seem designed to be surrounded by a wood; but the appearance may be accounted for: it does sometimes occur; and we are easily satisfied of the propriety, when the effect is so pleasing. Many buildings, which from their splendor best become an open exposure, will yet be sometimes not ill bestowed on a more se-

Vol. V.

questered spot, either to characterize or adorn it; and others, for which a solitary would in general be preferred to an eminent situation, may occasionally be objects in very conspicuous positions. A Grecian temple, from its peculiar grace and dignity, deserves every distinction; it may, however, in the depth of a wood, be so circumstanced, that the want of those advantages to which it seems entitled, will not be regretted. A happier situation cannot be devised, than that of the temple of Pan at the fourth lodge on Enfield chace. It is of the usual oblong form, encompassed by a colonnade; in dimensions, and in style, it is equal to a most extensive landscape: and yet by the antique and rustic air of its Doric columns without bases; by the chastity of its little ornaments, a crook, a pipe, and a serip, and those only over the doors; and by the simplicity of the whole both within and without; it is adapted with so much propriety to the thickets which conceal it from the view, that no one can wish it to be brought forward, who is sensible to the charms of the Arcadian scene which this building alone has created. On the other hand, a very spacious field, or sheep-walk, will not be disgraced by a cottage, a Dutch barn, or a hay-stack; nor will they, though small and familiar, appear to be inconsiderable or insignificant objects. Numberless other instances might be adduced to prove the impossibility of restraining particular buildings to particular situations, upon any general principles: the variety in their forms is hardly greater than in their application.

To this great variety must be added the many changes ⁵¹Of ruins. which may be made by the means of ruins. They are a class by themselves, beautiful as objects, expressive as characters, and peculiarly calculated to connect with appendages into elegant groupes. They may be accommodated with ease to irregularity of ground, and their disorder is improved by it. They may be intimately blended with trees and thickets; and the interruption is an advantage: for imperfection and obscurity are their properties; and to carry the imagination to something greater than is seen, is their effect. They may for any of these purposes be separated into detached pieces; contiguity is not necessary, nor even the appearance of it, if the relation be preserved; but straggling ruins have a bad effect; when the several parts are equally considerable. There should be one large mass to raise an idea of greatness, to attract the others about it, and to be a common centre of union to all: the smaller pieces then mark the original dimensions of one extensive structure; and no longer appear to be the remains of several little buildings.

All remains excite an inquiry into the former state of the edifice, and fix the mind in a contemplation of the use it was applied to; besides the characters expressed by their style and position, they suggest ideas which would not arise from the buildings if entire. The purposes of many have ceased: an abbey, or a castle, if complete, can now be no more than a dwelling; the memory of the times, and of the manners to which they are adapted, is preserved only in history, and in ruins; and certain sensations of regret, of veneration, or compassion, attend the recollection. Nor are these confined to the remains of buildings which are now in disuse: those of an old mansion raise

Section I.
ART.

reflections on the domestic comforts once enjoyed, and the ancient hospitality which reigned there. Whatever building we see in decay, we naturally contrast its present to its former state, and delight to ruminate on the comparison. It is true that such effects properly belong to real ruins; they are however produced in a certain degree by those which are fictitious: the impressions are not so strong, but they are exactly similar; and the representation, though it does not present facts to the memory, yet suggests subjects to the imagination. But, in order to affect the fancy, the supposed original design should be clear, the use obvious, and the form easy to be traced: no fragments should be hazarded without a precise meaning, and an evident connection; none should be perplexed in their construction, or uncertain as to their application. Conjectures about the form, raise doubts about the existence of the ancient structure: the mind must not be allowed to hesitate; it must be hurried away from examining into the reality, by the exactness and the force of the resemblance.

52
Description
of Tintern
abbey, [between
Chepstowe
and Monmouth.]

In the ruins of Tintern abbey, the original construction of the church is perfectly marked; and it is principally from this circumstance that they are celebrated as a subject of curiosity and contemplation. The walls are almost entire; the roof only is fallen in, but most of the columns which divided the aisles are still standing: of those which have dropped down, the bases remain, every one exactly in its place; and in the middle of the nave four lofty arches, which once supported the steeple, rise high in the air above all the rest, each reduced now to a narrow rim of stone, but completely preserving its form. The shapes even of the windows are little altered: but some of them are quite obscured, others partially shaded, by tufts of ivy; and those which are most clear, are edged with its slender tendrils, and lighter foliage, wreathing about the sides and the divisions: it winds round the pillars; it clings to the walls; and in one of the aisles clusters at the top in bunches, so thick and so large, as to darken the space below. The other aisles, and the great nave, are exposed to the sky: the floor is entirely overgrown with turf; and to keep it clear from weeds and bushes, is now its highest preservation. Monkish tomb-stones, and the monuments of benefactors long since forgotten, appear above the green sward; the

bases of the pillars which have fallen, rise out of it; Section I. ART. and maimed effigies, and sculpture worn with age and weather, Gothic capitals, carved cornices, and various fragments, are scattered about, or lie in heaps piled up together. Other shattered pieces, though disjointed and mouldering, still occupy their original places; and a stair-case much impaired, which led to a tower now no more, is suspended at a great height, uncovered and inaccessible. Nothing is perfect; but memorials of every part still subsist; all certain, but all in decay; and suggesting, at once, every idea which can occur in a seat of devotion, solitude, and desolation. Upon such models, fictitious ruins should be formed; and if any parts are entirely lost, they should be such as the imagination can easily supply from those which are still remaining. Distinct traces of the building which is supposed to have existed, are less liable to the suspicion of artifice, than an unmeaning heap of confusion. Precision is always satisfactory, but in the reality it is only agreeable; in the copy, it is essential to the imitation.

A material circumstance to the truth of the imitation, is, that the ruin appear to be very old. The idea is besides interesting in itself: a monument of antiquity is never seen with indifference; and a semblance of age may be given to the representation, by the hue of the materials, the growth of ivy and other plants, and cracks and fragments seemingly occasioned rather by decay than by destruction. An appendage evidently more modern than the principal structure will sometimes corroborate the effect: the shed of a cottager amidst the remains of a temple, is a contrast both to the former and to the present state of the building; and a tree flourishing among ruins, shews the length of time they have lain neglected. No circumstance so forcibly marks the desolation of a spot once inhabited, as the prevalence of nature over it:

“*Campes ubi Troja fuit,*”

is a sentence which conveys a stronger idea of a city totally overthrown, than a description of its remains; but in a representation to the eye, some remains must appear; and then the perversion of them to an ordinary use, or an intermixture of a vigorous vegetation, intimates a settled despair of their restoration.

PART II. OF THOSE PROPERTIES IN THE OBJECTS OF NATURE WHICH SHOULD DETERMINE THE CHOICE AND ARRANGEMENT OF THEM IN GARDENING.

SECT. I. *Of Art.*

THE several constituent parts of the scenes of nature having now been considered, the next inquiry is into the particular principles and circumstances which may affect them when they are applied to the subjects of gardening.

It has always been supposed, that *art* must then interfere: but art was carried to excess, when from accessory it became principal, and the subject upon which it was employed was brought under regulations less applicable to that than to any other; when ground, wood, and water, were reduced to mathema-

tical figures, and similarity and order were preferred to freedom and variety. These mischiefs, however, were occasioned, not by the use, but the perversion of art; it excluded, instead of improving upon nature, and thereby destroyed the very end it was called in to promote.

So strange an abuse probably arose from an idea of some necessary correspondence between the mansion, and the scene it immediately commanded: the forms, therefore, of both were determined by the same rules; and terraces, canals, and avenues, were but so many variations of the plan of the building. The regularity thus established spread afterwards to more distant

54
Of the appearance of art near the house.

distant quarters: there, indeed, the absurdity was acknowledged as soon as a more natural disposition appeared; but a prejudice in favour of art, as it is called, *just about the house*, still remains. If, by the term, *regularity* is intended, the principle is equally applicable to the vicinity of any other building; and every temple in the garden ought to have its concomitant formal slopes and plantations: or the conformity may be reversed, and we may as reasonably contend, that the building ought to be irregular, in order to be consistent with the scene it belongs to. The truth is, that both propositions are erroneous: architecture requires symmetry; the objects of nature freedom; and the properties of the one cannot with justice be transferred to the other. But if, by the term, no more is meant than merely *design*, the dispute is at an end: choice, arrangement, composition, improvement, and preservation, are so many symptoms of art, which may occasionally appear in several parts of a garden, but ought to be displayed without reserve near the house: nothing there should seem neglected; it is a scene of the most cultivated nature; it ought to be enriched, it it ought to be adorned; and design may be avowed in the plan, and expence in the execution.

Even regularity is not excluded: so capital a structure may extend its influence beyond its walls: but this power should be exercised only over its immediate appendages. The platform upon which the house stands, is generally continued to a certain breadth on every side; and, whether it be pavement or gravel, may undoubtedly coincide with the slope of the building. The road which leads up to the door may go off from it in an equal angle, so that the two sides shall exactly correspond: and certain ornaments, though detached, are yet rather within the province of architecture than of gardening. Works of sculpture are not, like buildings, objects familiar in scenes of cultivated nature; but vases, statues, and termini, are usual appendages to a considerable edifice: as such, they may attend the mansion, and trespass a little upon the garden, provided they are not carried so far into it as to lose their connection with the structure. The platform and the road are also appurtenances to the house; all these may therefore be adapted to its form, and the environs will thereby acquire a degree of regularity: but to give it to the objects of nature, only on account of their proximity to others which are calculated to receive it, is, at the best, a refinement.

§§
Of the approach.

UPON the same principles regularity has been required in the *approach*; and an additional reason has been assigned for it, that the idea of a seat is thereby extended to a distance. But that may be done by other means than by an avenue. A private road is easily known. If carried through grounds, or a park, it is commonly very apparent: even in a lane, here and there a bench, a painted gate, a small plantation, or any other little ornament, will sufficiently denote it: if the entrance only be marked, simple preservation will retain the impression along the whole progress. Or the road may wind through several scenes distinguished by objects, or by an extraordinary degree of cultivation; and then the length of the way, and the variety of improvements through which it is conducted, may extend the appearance of domain, and the idea of a seat, beyond the reach of any direct avenue.

An avenue being confined to one termination, and excluding every view on the sides, has a tedious sameness throughout: to be great, it must be dull; and the object to which it is appropriated, is after all seldom shown to advantage. Buildings, in general, do not appear so large, and are not so beautiful, when looked at in front, as when they are seen from an angular situation, which commands two sides at once, and throws them both into perspective. But a winding lateral approach is free from these objections; it may besides be brought up to the house without disturbing any of the views from it: but an avenue cuts the scenery directly in two, and reduces all the prospect to a narrow vista. A mere line of perspective, be the extent what it may, will seldom compensate for the loss of that space which it divides, and of the parts which it conceals.

The approach to Caversham, though a mile in length, and not once in sight of the house till close upon it, yet can never be mistaken for any other way than it is; a passage only through a park is not introduced with so much distinction, so precisely marked, or kept in such preservation. On each side of the entrance is an elegant lodge: the interval between them is a light open pallisade, crossing the whole breadth of a lovely valley: the road is conducted along the bottom, continually winding in natural easy sweeps, and presenting at every bend some new scene to the view: at last it gently slants up the side of a little rise to the mansion, where the eminence, which seemed considerable, is found to be a very elevated situation, to which the approach, without once quitting the valley, had been insensibly ascending all the way. In its progress, it never breaks the scenes through which it passes: the plantations and the glades are continued without interruption, quite across the valley: the opposite sides have a relation to each other, not answering, not contrasted, but connected: nor does the disposition ever seem to have been made with any attention to the road; but the scenes fill belong purely to the park; each of them is preserved entire, and avails itself of all the space which the situation will allow. At the entrance the slopes are very gentle, with a few large hawthorns, beeches, and oaks, scattered over them: these are thickened by the perspective as the valley winds; and just at the bend, a large clump hangs on a bold ascent, from whence different groups, growing gradually less and less till they end in single trees, stretch quite away to a fine grove which crowns the opposite brow. The road passes between the groups, under a light and lofty arch of ash; and then opens upon a glade, broken on the left only by a single tree, and on the right by several beeches standing so close together as to be but one in appearance. This glade is bounded by a beautiful grove, which in one part spreads a perfect gloom, but in others divides into different clusters, which leave openings for the gleams of light to pour in between them. It extends to the edge, and borders for some way the side of a collateral dale, which retires slowly from the view; and in which the falls of the ground are more tame, the bottom more flattened, than in the principal valley; the banks of this also, near the junction, are more gentle than before: but on the opposite side, the steep and the clumps still continue; and amongst them is a fine knole, from

56
Description
of the ap-
proach at
Caversham,
[the seat of
Lord Cadogan,
near Reading.]

Section I.
Art.

which descend two or three groups of large trees, feathering down to the bottom, and by the tendency of their branches favouring the declivity. To these succeeds an open space, diversified only by a few scattered trees; and in the midst of it, some magnificent beeches crowding together, overshadow the road, which is carried through a narrow darksome passage between them: soon after it rises under a thick wood in the garden up to the house, where it suddenly bursts out upon a rich and extensive prospect, with the town and the churches of Reading in full sight, and the hills of Windsor-forest in the horizon. Such a view at the end of a long avenue, would have been, at the best, but a compensation for the tediousness of the way; but here the approach is as delightful as the termination. Yet even in this, a similarity of style may be said to prevail. But it has every variety of open plantations; and these are not confusedly thrown together, but formed into several scenes, all of them particularly marked: one is characterized by a grove, the next by clumps, and others by little groups or single trees: the plantations sometimes cover only the brow, and retire along the top from the view; sometimes they seem to be suspended on the edge or the sides of the descents; in one place they leave the bottom clear, in another they overpread the whole valley: the intervals are often little less than lawns; at other times they are no more than narrow glades between the groves, or only small openings in the midst of a plantation. The ground, without being broken into diminutive parts, is cast into an infinite number of elegant shapes, in every gradation from the most gentle slope, to a very precipitate fall: the trees also are of several kinds, and their shadows of various tints; those of the horse-chestnuts are dark; the beeches spread a broader but less gloomy obscurity; and they are often so vast, they swell out in a succession of such enormous masses, that, though contiguous, a deep shade sinks in between them, and distinguishes each immense individual: such intervals are in some places filled up with other species; the maples are of so extraordinary a size, that they do not appear inconsiderable, when close to the forest-trees; large hawthorns, some oaks, and in one part many, perhaps too many limes, the remains of former avenues, are intermixed; and amongst all these often rise the tallest ash, whose lighter foliage only chequers the turf beneath, while their peculiar hue diversifies the greens of the groups they belong to.

If regularity is not entitled to a preference in the environs or approach to a house, it will be difficult to support its pretensions to a place in any more distant parts of a park or a garden. Formal slopes of ground are ugly: right or circular lines bounding water, do not indeed change the nature of the element; it still retains some of its agreeable properties; but the shape given to it is disgusting. Regularity in plantations is less offensive; we are habituated, as has been already observed, to straight lines of trees, in cultivated nature; a double row, meeting at the top, and forming a complete arched vista, has a peculiar effect; other regular figures have a degree of beauty: and to alter or to dissolve such a disposition, without destroying a number of fine trees, which cannot well be spared, may sometimes be difficult; but it hardly ever ought to be chosen in the arrangement of a young plantation.

Regularity was, however, once thought essential to every garden, and every approach; and it yet remains in many. It is still a character, denoting the neighbourhood of a gentleman's habitation; and an avenue, as an object in a view, gives to a house, otherwise inconsiderable, the air of a mansion. Buildings which answer one another at the entrance of an approach, or on the sides of an opening, have a similar effect; they distinguish at once the precincts of a seat from the rest of the country. Some pieces of sculpture also, such as vases and termini, may perhaps now and then be used, to extend the appearance of a garden beyond its limits, and to raise the mead in which they are placed above the ordinary improvements of cultivated nature. At other times they may be applied as ornaments to the most polished lawns; the traditional ideas we have conceived of Arcadian scenes, correspond with such decorations: and sometimes a solitary urn, inscribed to the memory of a person now no more, but who once frequented the shades where it stands, is an object equally elegant and interesting. The occasions, however, on which we may, with any propriety, trespass beyond the bounds of cultivated nature, are very rare; the force of the character can alone excuse the artifice avowed in expressing it.

SECT. II. Of Picturesque Beauty.

BUT regularity can never attain to a great share of beauty, and to none of the species called *picturesque*; a denomination in general expressive of excellence, but which, by being too indiscriminately applied, may be sometimes productive of errors. That a subject is recommended at least to our notice, and probably to our favour, if it has been distinguished by the pencil of an eminent painter, is indisputable: we are delighted to see those objects in the reality, which we are used to admire in the representation; and we improve upon their intrinsic merit, by recollecting their effects in the picture. The greatest beauties of nature will often suggest the remembrance; for it is the business of a landscape painter to select them: and his choice is absolutely unrestrained; he is at liberty to exclude all objects which may hurt the composition; he has the power of combining those which he admits in the most agreeable manner; he can even determine the season of the year, and the hour of the day, to shew his landscape in whatever light he prefers. The works therefore of a great master, are fine exhibitions of nature, and an excellent school wherein to form a taste for beauty: but still their authority is not absolute; they must be used only as studies, not as models; for a picture and a scene in nature, though they agree in many, yet differ in some particulars, which must always be taken into consideration, before we can decide upon the circumstances which may be transferred from the one to the other.

In their *dimensions* the distinction is obvious; the same objects on different scales have very different effects; those which seem monstrous on the one, may appear diminutive on the other; and a form, which is elegant in a small object, may be too delicate for a large one. Besides, in a canvas of a few feet, there is not room for every species of variety which in nature is pleasing. Though the characteristic distinction of trees may be marked, their more minute differences,

58
Of the different effects from the same objects in a scene and a picture.

57
Of regularity in the several parts of a garden.

which

which however enrich plantations, cannot be expressed: and a multiplicity of enclosures, catches of water, cottages, cattle, and a thousand other circumstances, which enliven a prospect, are, when reduced into a narrow compass, no better than a heap of confusion. Yet, on the other hand, the principal objects must often be more diversified in a picture than in a scene: a building which occupies a considerable portion of the former, will appear small in the latter when compared to the space all around it; and the number of parts which may be necessary to break its sameness in one, will aggravate its insignificance in the other. A tree which presents one rich mass of foliage, has sometimes a fine effect in nature; but when painted, is often a heavy lump, which can be lightened only by separating the boughs, and shewing the ramifications between them. In several other instances the object is frequently affected by the proportion it bears to the actual, not the ideal, circumjacent extent.

Painting, with all its powers, is still more unequal to some subjects, and can give only a *faint, if any, representation* of them: but a gardener is not therefore to reject them: he is not debarred from a view down the sides of a hill, or a prospect where the horizon is lower than the station, because he never saw them in a picture. Even when painting exactly imitates the appearances of nature, it is often weak in conveying the *ideas* which they excite, and on which much of their effect sometimes depends. This however is not always a disadvantage; the appearance may be more pleasing than the idea which accompanies it, and the omission of the one may be an improvement of the other. Many beautiful tints denote disagreeable circumstances: the hue of a barren heath is often finely diversified; a piece of bare ground is sometimes overpread with a number of delicate shades; and yet we prefer a more uniform verdure to all their variety. In a picture, the several tints which occur in nature may be blended, and retain only their beauty, without suggesting the poverty of the soil which occasions them: but in the reality, the cause is more powerful than the effect: we are less pleased with the sight, than we are hurt by the reflection; and a most agreeable mixture of colours may prevent no other idea than of dreariness and sterility.

On the other hand, *utility* will sometimes supply the want of beauty in the reality, but not in a picture. In the former, we are never totally inattentive to it; we are familiarised to the marks of it; and we allow a degree of merit to an object which has no other recommendation. A regular building is generally more agreeable in a scene than in a picture, and an adjacent platform, if evidently convenient, is tolerable in the one; it is always a right line too much in the other. Utility is at the least an excuse, when it is real; but it is an idea never included in the representation.

Many more instances might be alleged to prove, that the subjects for a painter and a gardener are not always the same. Some which are agreeable in the reality, lose their effect in the imitation; and others, at the best, have less merit in a scene than in a picture. The term *picturesque* is therefore applicable only to such objects in nature, as, after allowing for the differences between the arts of painting and of gardening, are fit to be formed into groupes, or to enter into a composition where the several parts have a relation

to each other, and in opposition to those which may be spread abroad in detail, and have no merit but as individuals.

SECT. III. *Of Character.*

CHARACTER is very reconcilable with beauty; and, even when independent of it, has attracted so much regard, as to occasion several frivolous attempts to produce it: statues, inscriptions, and even paintings, history and mythology, and a variety of devices, have been introduced for this purpose. The heathen deities and heroes have therefore had their several places assigned to them in the woods and the lawns of a garden: natural cascades have been disfigured with rivers; and columns erected only to receive quotations: the compartments of a summer-house have been filled with pictures of gambols and revels, as significant of gaiety: the cypresses, because it was once used in funerals, has been thought peculiarly adapted to melancholy: and the decorations, the furniture, and the environs of a building, have been crowded with puerilities under pretence of propriety. All these devices are rather *emblematical* than expressive: they may be ingenious contrivances, and recall absent ideas to the recollection; but they make no immediate impression: for for they must be examined, compared, perhaps explained, before the whole design of them is well understood: and though an allusion to a favourite or well-known subject of history, of poetry, or of tradition, may now and then animate or dignify a scene; yet as the subject does not naturally belong to a garden, the allusion should not be principal: it should seem to have been suggested by the scene; a transitory image, which irresistibly occurred; not fought for, not laboured; and have the force of a metaphor, free from the detail of an allegory.

ANOTHER species of character arises from direct *imitation*; when a scene or an object, which has been celebrated in description, or is familiar in idea, is represented in a garden. Artificial ruins, lakes, and rivers, fall under this denomination. The air of a seat extended to a distance, and scenes calculated to raise ideas of Arcadian elegance or of rural simplicity, with many more which have been occasionally mentioned or will obviously occur, may be ranked in this class. They are all representations. But the materials, the dimensions, and other circumstances, being the same in the copy and the original, their effects are similar in both: and if not equally strong the defect is not in the resemblance; but the consciousness of an imitation checks that train of thought which the appearance naturally suggests. Yet an over-anxious solicitude to disguise the fallacy is often the means of exposing it: too many points of likeness sometimes hurt the deception; they seem studied and forced; and the affectation of resemblance destroys the supposition of a reality. A hermitage is the habitation of a recluse; it should be distinguished by its solitude, and its simplicity: but if it is filled with crucifixes, hour-glasses, beads, and every other trinket which can be thought of, the attention is diverted from enjoying the retreat to examining the particulars: all the collateral circumstances which agree with a character, seldom meet in one subject; and when they are indistinctly brought together, though each be natural, the collection is artificial.

59
Of emblematical
characters.

60
Of imitative
characters.

The peculiar advantages which gardening has over other imitative arts, will not, however, support attempts to introduce, they rather forbid the introduction of characters, to which the space is not adequate. A plain simple field, unadorned but with the common rural appendages, is an agreeable opening; but if it is extremely small, neither a hay-stack, nor a cottage, nor a stile, nor a path, nor much less all of them together, will give it an air of reality. A harbour or an artificial lake is but a conceit: it raises no idea of refuge or security; for the lake does not suggest an idea of danger: it is detached from the large body of water; and yet it is in itself but a poor inconsiderable basin, vainly affecting to mimic the majesty of the sea. When imitative characters in gardening are egregiously defective in any material circumstance, the truth of the other things exposes and aggravates the failure.

61
Of original
characters.

BUT the art of gardening aspires to more than imitation: it can create *original* characters, and give expressions to the several scenes superior to any they can receive from allusions. Certain properties, and certain dispositions, of the objects of nature, are adapted to excite particular ideas and sensations: many of them have been occasionally mentioned; and all are very well known. They require no discernment, examination, or discussion; but are obvious at a glance, and instantaneously distinguished by our feelings. Beauty alone is not so engaging as this species of character: the impressions it makes are more transient and less interesting; for it aims only at delighting the eye, but the other affects our sensibility. An assemblage of the most elegant forms in the happiest situations is to a degree indiscriminate, if they have not been selected and arranged with a design to produce certain expressions; an air of magnificence, or of simplicity, of cheerfulness, tranquillity, or some other general character, ought to pervade the whole; and objects pleasing in themselves, if they contradict that character, should therefore be excluded: those which are only indifferent, must sometimes make room for such as are more significant; many will often be introduced for no other merit than their expression; and some, which are in general rather disagreeable, may occasionally be recommended by it. Barrenness itself may be an acceptable circumstance in a spot dedicated to solitude and melancholy.

The power of such characters is not confined to the ideas which the objects immediately suggest; for these are connected with others, which insensibly lead to subjects, far distant, perhaps, from the original thought, and related to it only by a similitude in the sensations they excite. In a prospect, enriched and enlivened with inhabitants and cultivation, the attention is caught at first by the circumstances which are gayest in their season, the bloom of an orchard, the festivity of a hay-field, and the carols of harvest-home: but the cheerfulness which these infuse into the mind, expands afterwards to other objects than those immediately presented to the eye; and we are thereby disposed to receive, and delighted to pursue, a variety of pleasing ideas, and every benevolent feeling. At the sight of a ruin, reflections on the change, the decay, and the desolation before us, naturally occur; and they introduce a long succession of others, all tinged with that melancholy which these have inspired:

or if the monument revive the memory of former times, we do not stop at the simple fact which it records, but recollect many more coeval circumstances, which we see, not perhaps as they were, but as they are come down to us, venerable with age, and magnified by fame. Even, without the assistance of buildings, or other adventitious circumstances, nature alone furnishes materials for scenes which may be adapted to almost every kind of expression: their operation is general, and their consequences infinite: the mind is elevated, depressed, or composed, as gaiety, gloom, or tranquillity, prevail in the scene; and we soon lose sight of the means by which the character is formed: we forget the particular objects it presents; and giving way to their effects, without recurring to the cause, we follow the track they have begun, to any extent which the disposition they accord with will allow. It suffices that the scenes of nature have a power to affect our imagination and our sensibility: for such is the constitution of the human mind, that if once it is agitated, the emotion often spreads far beyond the occasion; when the passions are roused, their course is unrestrained; when the fancy is on the wing, its flight is unbounded; and, quitting the inanimate objects which first gave them their spring, we may be led by thought above thought, widely differing in degree, but still corresponding in character, till we rise from familiar subjects up to the sublimest conceptions, and are rapt in the contemplation of whatever is great or beautiful, which we see in nature, feel in man, or attribute to divinity.

SECT. IV. Of the General Subject.

THE scenes of nature are also affected by the general subject to which they are applied, whether that be a *farm*, a *garden*, a *park*, or a *riding*. These may all indeed be parts of one place; they may border on each other; they may, to a degree, be intermixed; but each is still a character of such force, that, whichever prevails, the propriety of all other characters, and of every species of beauty, must be tried by their conformity to this. And circumstances necessary to one, may be incongruities in the rest: *elegance* is the peculiar excellence of a garden, *greatness* of a park, *simplicity* of a farm, and *pleasantness* of a riding. These distinguishing properties will alone exclude from the one, many objects which are very acceptable in the others; but these are not the only properties in which they essentially differ.

A garden is intended to walk or to sit in, which are circumstances not considered in a riding; a park comprehends all the uses of the other two; and these uses determine the *proportional extent* of each. A large garden would be but a small park; and the circumference of a considerable park but a short riding. A farm is in some measure denominated from its size: if it greatly exceed the dimensions of a garden, so that its bounds are beyond the reach of a walk, it becomes a riding. A farm and a garden hence appear to be calculated for indolent, a riding for active amusements, and a park for both: seats, therefore, and buildings for refreshment or indulgence, should be frequent in a garden or a farm; should sometimes occur in a park; but are unnecessary in a riding.

Within the narrow compass of a garden, there is
not

62
Difference
between a
farm, a ga-
den, a park
and a ri-
ding.

Section IV.
GENERAL
SUBJECT

Section V.
GARDEN.

not room for *distant effects*. On the other hand, it allows of objects which are striking only in a *single point of view*; for we may stop there to contemplate them: and an obscure catch, or a partial glimpse of others, are also acceptable circumstances, in the leisure of a seat, or even in the course of a loitering walk. But these are lost in a riding, where the pleasantness of the road, not the spot, is the principal consideration; and its greatest improvement is a distant object, which may be seen from several points, or along a considerable part of the way. *Minute beauties* in general may abound in a garden; they may be frequent in a farm; in both we have opportunities to observe and to examine them: in a park, they are below our notice; in a riding, they escape it.

Prospects are agreeable to either of the four general subjects, but not equally necessary to all. In a garden, or in a farm, scenes within themselves are often satisfactory; and, in their retired spots, an opening would be improper. A park is defective, if confined to its inclosure: a perpetual succession of home-scenes, through so large an extent, wants variety; and fine prospects are circumstances of greatness: but they are not required in every part. The place itself supplies many noble views; and these are not much improved by a distant rim, or a little peep of the country, which is inadequate to the rest of the composition. A riding has seldom much beauty of its own; it depends on objects without for its pleasantness: if it only leads now and then to a striking point, and is dull all the rest of the way, it will not be much frequented; but very moderate views are sufficient to render its progress agreeable.

By concealing, therefore, much of the prospects, we destroy the amusement of a riding. The view of the country should not be hurt by the improvements of the road. In a garden, on the contrary, continuation of shade is very acceptable; and if the views be sometimes interrupted, they may still be caught from many points: we may enjoy them there whenever we please; and they would pass if constantly in sight. The best situation for a house is not that which has the greatest command; a cheerful look-out from the windows is all that the proprietor desires. He is more sensible to the charms of the greater prospects, if he sees them only occasionally, and they do not become insipid by being familiar: for the same reason he does not wish for them in every part of his garden; and temporary concealments give them fresh spirit whenever they appear. But the views of a riding are not visited so often, as thereby to lose any of their effect. Plantations, therefore, in a country, should be calculated rather for objects to look at, than for shades to pass through. In a park, they may answer both purposes: but in a garden, they are commonly considered as places to walk or to sit in. As such, too, they are most welcome in a farm: but still the distinction between an improved and an ordinary farm being, by no circumstance, so sensibly marked, as by the arrangement of the trees, they are more important, as objects, there than in a garden.

Though a farm and a garden agree in many particulars connected with extent, yet, in *style*, they are the two extremes. Both, indeed, are subjects of cultivation: but cultivation in the one is *husbandry*, and

in the other *decoration*; the former is appropriated to *profit*, the latter to *pleasure*. Fields profusely ornamented do not retain the appearance of a farm; and an apparent attention to produce, obliterates the idea of a garden. A park is sometimes not much hurt by being turned to account. The use of a riding is to lead from one beauty to another, and be a scene of pleasure all the way: made avowedly for that purpose only, it admits more embellishment and distinction than an ordinary road through a farm. See the articles FARM, PARK, and RIDING.

SECT. V. Of a Garden.

THE gravel paths have been mentioned † as contributing to the appearance of a garden: they are unusual elsewhere; they constantly present the idea of a walk; and the correspondence between their sides, the exactness of the edges, the nicety of the materials and of the preservation, appropriate them to spots in the highest state of improvement. Applied to any other subject than a park, their effect is the same. A field, surrounded by a gravel-walk, is, to a degree, bordered by a garden; and many ornaments may be introduced as appendages to the latter, which would otherwise appear to be inconsistent with the former. When these accompaniments occupy a considerable space, and are separated from the field, the idea of a garden is complete as far as they extend; but if the gravel be omitted, and the walk be only of turf, a greater breadth to the border, and more richness in the decorations, are necessary to preserve that idea.

Many gardens are nothing more than such a *walk round a field*; that field is often raised to the character of a lawn: and sometimes the inclosure is, in fact, a paddock. Whatever it be, the walk is certainly garden: it is a spot set apart for pleasure; it admits on the sides a profusion of ornament; it is fit for the reception of every elegance, and requires the nicest preservation: it is attended also with many advantages; may be made and kept without much expence; leads to a variety of points; and avails itself, in its progress, of the several circumstances which belong to the inclosure it surrounds, whether they be the rural appurtenances of a farm, or those more refined which distinguish a paddock.

But it has at the same time its inconveniences and defects. Its approach to the several points is always circuitous, and they are thereby often thrown to a distance from the house and from each other: there is no access to them across the open exposure: the way must constantly be the same: the view all along is into one opening, which must be peculiarly circumstanced, to furnish within itself a sufficient variety: and the embellishments of the walk are seldom important; their number is limited; and the little space allotted for their reception admits only of those which can be accommodated to the scale, and will conform to the character. This species of garden, therefore, reduces almost to a sameness all the places it is applied to: the subject seems exhausted: no walk round a field can now be very different from several others already existing. At the best too it is but a walk: the fine scenery of a garden is wanting: and that in the field, which is substituted in its stead, is generally of an inferior character; and often defective in connection with the spot which com-

63
Of a garden
surrounding an
inclosure.

† See the article PARK.

mands

Section V.
GARDEN.

mands it, by the intervention of the fence, or the visible difference in the preservation.

This objection, however, has more or less force according to the character of the inclosure. If that be a paddock or a lawn, it may exhibit scenes not unworthy of the most elegant garden; which agreeing in style, will unite in appearance, with the walk. The other objections also are stronger or weaker in proportion to the space allowed for the appendages; and not applicable at all to a broad circuit of garden, which has room within itself for scenery, variety, and character: but the common narrow walk, too indiscriminately in fashion, if continued to a considerable extent, becomes very tiresome; and the points it leads to must be more than ordinarily delightful, to compensate for the fatigue of the way.

This tediousness may, however, be remedied, without any extravagant enlargement of the plan, by taking in, at certain intervals, an additional breadth, sufficient only for a little scene to interrupt the uniformity of the progress. The walk is then a communication, not between points of view, through all which it remains unaltered; but between the several parts of a garden, in each of which it is occasionally lost; and, when resumed, it is at the worst a repetition, not a continuation of the same idea; the eye and the mind are not always confined to one track; they expatiate at times, and have been relieved before they return to it. Another expedient, the very reverse of this, may now and then be put in practice: it is to contract, instead of enlarging, the plan; to carry the walk, in some part of its course, directly into the field, or at the most to secure it from cattle; but, to make it quite simple, omit all its appendages, and drop every idea of a garden. If neither of these, nor any other means, be used to break the length of the way, though the inclosure should furnish a succession of scenes, all beautiful, and even contrasted to each other, yet the walk will introduce a similarity between them. This species of garden, therefore, seems proper only for a place of a very moderate extent; if it be stretched out to a great length, and not mixed with other characters, its sameness hurts that variety, which it is its peculiar merit to discover.

64
Of a garden which occupies the whole inclosure.

BUT the advantages attending it upon some, and the use of it on so many, occasions, have raised a partiality in its favour; and it is often carried round a place, where *the whole inclosure is garden*: the interior openings and communications furnish there a sufficient range; and they do not require that number and variety of appendages, which must be introduced to disguise the uniformity of the circuitous walk, but which often interfere with greater effects. It is at the least unnecessary in such a garden; but plain gravel-walks to every part are commonly deemed to be indispensable: they undoubtedly are convenient; but it must also be acknowledged, that though sometimes they adorn, yet at other times they disfigure, the scenes through which they are conducted. The proprietor of the place, who visits these scenes at different seasons, is most anxious for their beauty in fine weather; he does not feel the restraint to be grievous, if all of them be not at all times equally accessible; and a gravel-walk perpetually before him, especially when it is useless, must be irksome. It ought not, therefore, to be ostentatiously

shewn; on many occasions it should be industriously concealed: that it lead to the capital points is sufficient: it can never be requisite along the whole extent of every scene: it may often skirt a part of them, without appearing; or just touch upon them, and without hurting them, it ought commonly to be omitted.

The sides of a gravel-walk must correspond, and its course be in sweeps gently bending all the way. It preserves its form, though conducted through woods, or along glades, of the most licentious irregularity. But a grass walk is under no restraint; the sides of it may be perpetually broken, and the direction frequently changed: sudden turns, however, are harsh; they check the idea of progress; they are rather disappointments than varieties; and if they are similar, they are in the worst style of affectation. The line must be curved, but it should not be too wretched; if it be truly serpentine, it is the most unnatural of any. It ought constantly to proceed; and wind only just so much, that the termination of the view may differ at every step, and the end of the walk never appear: the thickets which confine it should be diversified with several mixtures of greens; no distinctions in the forms of the shrubs or the trees will be lost, when there are opportunities to observe them so nearly; and combinations and contrasts without number may be made, which will be there truly ornamental. Minute beauties are proper in a spot precluded from great effects: and yet such a walk, if it be broad, is by no means insignificant; it may have an importance which will render it more than a mere communication.

BUT the peculiar merit of that species of garden which occupies the whole inclosure, consists in the larger scenes: it can make room for them both in breadth and in length; and being dedicated entirely to pleasure, free from all other considerations, those scenes may be in any style which the nature of the place will allow: a number of them is expected; all different; sometimes contrasted; and each distinguished by its beauty. If the space be divided into little slips, and made only a collection of walks, it forfeits all its advantages, loses its character, and can have no other excellence than such as it may derive from situation; whereas, by a more liberal disposition, it may be made independent of whatever is external; and though prospects are no where more delightful than from a point of view which is also a beautiful spot, yet if in such a garden they should be wanting, the elegant, picturesque, and various scenes within itself, almost supply the deficiency.

This is the character of the gardens at Stowe: for there the views in the country are only circumstances of the views in the garden; and the principal advantage of the situation is the variety of the ground within the inclosure. The house stands on the brow of a gentle ascent; part of the gardens lie on the declivity, and spread over the bottom beyond it: this eminence is separated by a broad winding valley from another which is higher and steeper; and the descents of both are broken by large dips and hollows, sloping down the sides of the hills. The whole space is divided into a number of scenes, each distinguished with taste and fancy; and the changes are so frequent, so sudden, and complete, the transitions so artfully conducted, that

Section V.
GARDEN.

65
Description of the gardens at Stowe.

that the same ideas are never continued or repeated to fatyety.

These gardens were begun when regularity was in fashion; and the original boundary is still preserved, on account of its magnificence: for round the whole circuit, of between three or four miles, is carried a very broad gravel walk, planted with rows of trees, and open either to the park or the country; a deep-funk fence attends it all the way, and comprehends a space of near four hundred acres. But in the interior scenes of the garden, few traces of regularity appear: where it yet remains in the plantations, it is generally disguised: every symptom, almost, of formality is obliterated from the ground; and an octagon basin in the bottom, is now converted into an irregular piece of water, which receives on one hand two beautiful streams, and falls on the other down a cascade into a lake.

In the front of the house is a considerable lawn, open to the water: beyond which are two elegant Doric pavilions, placed in the boundary of the garden, but not marking it, though they correspond to each other; for still further back, on the brow of some rising grounds without the inclosure, stands a noble Corinthian arch, by which the principal approach is conducted, and from which all the gardens are seen, reclining back against their hills: they are rich with plantations; full of objects; and, lying on both sides of the house almost equally, every part is within a moderate distance, notwithstanding the extent of the whole.

On the right of the lawn, but concealed from the house, is a perfect garden-scene, called the *queen's amphitheatre*, where art is avowed, though formality is avoided. The fore ground is scooped into a gentle hollow. The plantations on the sides, though but just rescued from regularity, yet in style are contrasted to each other: they are, on one hand, chiefly thickets, standing out from a wood; on the other, they are open groves, through which a glimpse of the water is visible. At the end of the hollow, on a little knole, quite detached from all appendages, is placed an open Ionic rotunda: beyond it, a large lawn slopes across the view; a pyramid stands on the brow; the queen's pillar, in a recess on the descent; and all the three buildings, being evidently intended for ornament alone, are peculiarly adapted to a garden-scene. Yet their number does not render it gay: the dusky hue of the pyramid, the retired situation of the queen's pillar, and the solitary appearance of the rotunda, give it an air of gravity; it is encompassed with wood; and all the external views are excluded; even the opening into the lawn is but an opening into an inclosure.

At the king's pillar, very near to this, is another lovely spot; which is small, but not confined; for no termination appears: the ground one way, the water another, retire under the trees out of sight, but nowhere meet with a boundary. The view is first over some very broken ground, thinly and irregularly planted; then between two beautiful clumps, which feather down to the bottom; and afterwards across a glade, and through a little grove beyond it, to that part of the lake, where the thickets, close upon the brink, spread a tranquillity over the surface, in which their shadows are reflected. Nothing is admitted to disturb that quiet: no building obtrudes: for objects

to fix the eye are needless in a scene, which may be comprehended at a glance; and none would suit the pastoral idea it inspires, of elegance too refined for a cottage, and of simplicity too pure for any other edifice.

The situation of the rotunda promises a prospect more enlarged; and in fact most of the objects on this side of the garden are there visible: but they want both connection and contrast; each belongs peculiarly to some other spot: they are all blended together in this, without meaning; and are rather shewn on a map, than formed into a picture. The water only is capital; a broad expanse of it is so near as to be seen under the little groups on the bank without interruption. Beyond it is a wood, which in one place leaves the lake, to run up behind a beautiful building, of three pavilions joined by arcades, all of the Ionic order: it is called *Kent's Building*. And never was a design more happily conceived: it seems to be characteristically proper for a garden; it is so elegant, so varied, and so purely ornamental: it directly fronts the rotunda, and a narrow rim of the country appears above the trees beyond it. But the effect even of this noble object is fainter here than at other points: its position is not the most advantageous; and it is but one among many other buildings, none of which are principal.

The scene at the temple of Bacchus is in character directly the reverse of that about the rotunda, though the space and the objects are nearly the same in both: but in this, all the parts concur to form one whole. The ground from every side shelves gradually towards the lake; the plantations on the further bank open to shew Kent's building, rise from the water's edge towards the knole on which it stands, and close again behind it. That elegant structure, inclined a little from a front view, becomes more beautiful by being thrown into perspective; and though at a greater distance, is more important than before, because it is alone in the view: for the queen's pillar and the rotunda are removed far aside; and every other circumstance refers to this interesting object: the water attracts, the ground and the plantations direct, the eye thither; and the country does not just glimmer in the offskip, but is close and eminent above the wood, and connected by clumps with the garden. The scene altogether is a most animated landscape: and the splendor of the building; the reflection in the lake; the transparency of the water, and the picturesque beauty of its form, diversified by little groupes on the brink, while on the broadest expanse no more trees cast their shadows than are sufficient to vary the tints of the surface; all these circumstances, vying in lustre with each other, and uniting in the point to which every part of the scene is related, diffuse a peculiar brilliancy over the whole composition.

The view from Kent's building, is very different from those which have been hitherto described. They are all directed down the declivity of the lawn. This rises up the ascent: the eminence being crowned with lofty wood, becomes thereby more considerable; and the hillocks into which the general fall is broken, sloping further out this way than any other, they also acquire an importance which they had not before: that, particularly, on which the rotunda is placed,

seems here to be a profound situation; and the structure appears to be properly adapted to so open an exposure. The temple of Bacchus, on the contrary, which commands such an illustrious view, is itself a retired object, close under the covert. The wood rising on the brow, and descending down one side of the hill, is shewn to be deep; is high, and seems to be higher than it is. The lawn too is extensive; and part of the boundary being concealed, it suggests the idea of a still greater extent. A small portion only of the lake indeed is visible; but it is not here an object: it is a part of the spot; and neither termination being in sight, it has no diminutive appearance: if more water had been admitted, it might have hurt the character of the place, which is sober and temperate; neither solemn nor gay; great and simple, but elegant; above rusticity, yet free from ostentation.

These are the principal scenes on one side of the gardens. On the other, close to the lawn before the house, is the winding valley above-mentioned: the lower part of it is assigned to the Elysian fields. These are watered by a lovely rivulet; are very lightsome, and very airy, so thinly are the trees scattered about them; are open at one end to more water and a larger glade; and the rest of the boundary is frequently broken to let in objects afar off, which appear still more distant from the manner of shewing them. The entrance is under a Doric arch, which coincides with an opening among the trees, and forms a kind of vista, through which a Pembroke bridge just below, and a lodge built like a castle in the park, are seen in a beautiful perspective. That bridge is at one extremity of the gardens; the queen's pillar is at another; yet both are visible from the same station in the Elysian fields: and all these external objects are unaffectedly introduced, divested of their own appurtenances, and combined with others which belong to the spot. The temple of friendship also is in sight, just without the place: and within it, are the temples of ancient virtue, and of the British worthies; the one in an elevated situation, the other low down in the valley, and near to the water: both are decorated with the effigies of those who have been most distinguished for military, civil, or literary merit; and near to the former stands a rostral column, sacred to the memory of captain Grenville, who fell in an action at sea: by placing here the meed of valour, and by filling these fields with the representations of those who have deserved best of mankind, the character intended to be given to the spot is justly and poetically expressed; and the number of the images which are presented or excited, perfectly corresponds with it. Solitude was never reckoned among the charms of Elysium; it has been always pictured as the mansion of delight and of joy: and in this imitation, every circumstance accords with that established idea. The vivacity of the stream which flows through the vale; the glimpses of another approaching to join it; the sprightly verdure of the green sward, and every bust of the British worthies reflected in the water; the variety of the trees: the lightness of the greens; their disposition; all of them distinct objects, and dispersed over gentle inequalities of the ground; together with the multiplicity of objects both within and without, which embellish and enliven the scene; give it a gaiety, which the imagi-

nation can hardly conceive, or the heart wish to be exceeded.

Close by this spot, and a perfect contrast to it, is the alder grove; a deep recess, in the midst of a shade, which the blaze of noon cannot brighten. The water seems to be a stagnated pool, eating into its banks; and of a peculiar colour, not dirty but clouded, and dimly reflecting the dun hue of the horse-chestnuts and alders which press upon the brink: the stems of the latter, rising in clusters from the same root, bear one another down, and slant over the water. Mithapen elms and ragged firs are frequent in the wood which encompasses the hollow; the trunks of dead trees are left standing amongst them; and the uncouth fumach, and the yew, with elder, nut, and holly, compose the underwood: some limes and laurels are intermixt; but they are not many: the wood is in general of the darkest greens; and the foliage is thickened with ivy, which not only twines up the trees, but creeps also over the falls of the ground: these are steep and abrupt: the gravel-walk is covered with moss; and a grotto at the end, faced with broken flints and pebbles, preserves, in the simplicity of its materials, and the duskiness of its colour, all the character of its situation: two little rotundas near it were better away; one building is sufficient for such a scene of solitude as this, in which more circumstances of gloom concur than were ever perhaps collected together.

Immediately above the alder-grove is the principal eminence in the gardens. It is divided by a great dip into two pinnacles; upon one of which is a large Gothic building. The space before this structure is an extensive lawn: the ground on one side falls immediately into the dip; and the trees which border the lawn, sinking with the ground, the house rises above them, and fills the interval: the vast pile seems to be still larger than it is; for it is thrown into perspective, and between and above the heads of the trees, the upper story, the porticoes, the turrets and ballustrades, and all the slated roofs, appear in a noble confusion. On the other side of the Gothic building, the ground slopes down a long-continued declivity into a bottom, which seems to be perfectly irriguous. Divers streams wander about it in several directions: the conflux of that which runs from the Elysian fields with another below it, is full in sight; and a plain wooden bridge thrown over the latter, and evidently designed for a passage, imposes an air of reality on the river. Beyond it is one of the Doric porticoes which front the house; but now it is alone; it stands on a little bank above the water, and is seen under some trees at a distance before it: thus grouped, and thus accompanied, it is a happy incident, concurring with many other circumstances to distinguish this landscape by a character of cheerfulness and amenity.

From the Gothic building a broad walk leads to the Grecian valley, which is a scene of more grandeur than any in the gardens. It enters them from the park, spreading at first to a considerable breadth; then winds; grows narrower, but deeper; and loses itself at last in a thicket, behind some lofty elms, which interrupt the sight of the termination. Lovely woods and groves hang all the way on the declivities: and the open space is broken by detached trees; which, near the park, are cautiously and sparingly introduced.

left the breadth should be contracted by them; but as the valley sinks, they advance more boldly down the sides, stretch across or along the bottom, and cluster at times into groups and forms, which multiply the varieties of the larger plantations. Those are sometimes close coverts, and sometimes open groves: the trees rise in one upon high stems, and feather down to the bottom in another; and between them are short openings into the park or the gardens. In the midst of the scene, just at the bend of the valley, and commanding it on both sides, upon a large, easy, natural rise, is placed the temple of Concord and Victory: at one place its majestic front of six Ionic columns, supporting a pediment filled with bas relief, and the points of it crowned with statues, faces the view; at another, the beautiful colonnade, on the side, of ten lofty pillars, retires in perspective. It is seen from every part; and impressing its own character of dignity on all around, it spreads an awe over the whole: but no gloom, no melancholy attends it: the sensations it excites are rather placid; but full of respect, admiration, and solemnity: no water appears to enliven, no distant prospect to enrich, the view; the parts of the scene are large, the idea of it sublime, and the execution happy; it is independent of all adventitious circumstances, and relies on itself for its greatness.

The scenes which have been described are such as are most remarkable for beauty or character: but the gardens contain many more: and even the objects in these, by their several combinations, produce very different effects, within the distance sometimes of a few paces, from the unevenness of the ground, the variety of the plantations, and the number of the buildings. The multiplicity of the last has indeed been often urged as an objection to Stowe; and certainly, when all are seen by a stranger in two or three hours, twenty or thirty capital structures, mixed with others of inferior note, do seem too many. But the growth of the wood every day weakens the objection, by concealing them one from the other: each belongs to a distinct scene; and if they are considered separately, at different times, and at leisure, it may be difficult to determine which to take away. Yet still it must be acknowledged that their frequency destroys all ideas of silence and retirement. Magnificence and splendor are the characteristics of Stowe: it is like one of those places celebrated in antiquity, which were devoted to the purposes of religion, and filled with sacred groves, hallowed fountains, and temples dedicated to several deities; the resort of distant nations, and the object of veneration to half the heathen world: this pomp is, at Stowe, blended with beauty; and the place is equally distinguished by its amenity and its grandeur.

In the midst of so much embellishment as may be introduced into this species of garden, a plain field, or a sheep-walk, is sometimes an agreeable relief, and even wilder scenes may occasionally be admitted. These indeed are not properly parts of a garden, but they may be comprehended within the verge of it; and their proximity to the more ornamented scenes is at least a convenience, that the transition from the one to the other may be easy, and the change always in our option. For though a spot in the highest state of improvement be a necessary appendage to a seat; yet, in a place which is perfect, other characters will not be

wanting: if they cannot be had on a large scale, they are acceptable on a smaller; and so many circumstances are common to all, that they may often be intermixed; they may always border on each other.

SECT. VI. *Of the Seasons.*

To every view belongs a light which shews it to advantage: every scene and every object is in its highest beauty only at particular hours of the day; and every place is, by its situation or its character, peculiarly agreeable in certain months of the year. The *seasons* thus become subjects of consideration in gardening; and when several of those circumstances which distinguish a spot more at one time than another happen to concur, it will often be worth the while to add to their number, and to exclude such as do not agree with them, for no other purpose than to strengthen their effect at that particular time. Different parts may thus be adapted to different seasons, and each in its turn will be in perfection. But if the place will not allow of such a succession, still *occasional effects* may often be secured and improved, without prejudice to the scene when they are past, and without affectation while they continue.

The temple of Concord and Victory at Stowe has been mentioned as one of the noblest objects that ever adorned a garden: but there is a moment when it appears in singular beauty. The setting sun shines on the long colonnade which faces the west: all the lower parts of the building are darkened by the neighbouring wood: the pillars rise at different heights out of the obscurity; some of them are nearly overspread with it, some are chequered with a variety of tints, and others illuminated almost down to their bases. The light is gently softened off by the rotundity of the columns: but it spreads in broad gleams upon the wall within them; and pours full and without interruption on all the entablature, distinctly marking every dentil. On the statues which adorn the several points of the pediment, a deep shade is contrasted to splendor: the rays of the sun linger on the side of the temple long after the front is overcast with the sober hue of evening; and they tip the upper branches of the trees, or glow in the openings between them, while the shadows lengthen across the Grecian valley.

Such an occasional effect, however transient, is so exquisitely beautiful, that it would be unpardonable to neglect it. Others may be produced at several hours of the day; and the disposition of the buildings, of the ground, the water, and the plantations, may often be accommodated to support them. There are also occasional effects in certain months, or only weeks, of the year, arising from some particular bloom, some occupation then carrying on, or other incident, which may so far deserve attention as to recommend a choice and arrangement of objects, which at that time will improve the composition, though at another they may have no extraordinary merit.

BESIDES these transitory effects, there are others which may be defined and produced with more exactness, which are fixed to stated periods, and have certain properties belonging to them. Some species and situations of objects are in themselves adapted to receive or to make the impressions which characterize

the principal parts of the day: their splendor, their sobriety, and other peculiarities, recommend or prohibit them upon different occasions. The same considerations direct the choice also of their appendages; and in consequence of a judicious assemblage and arrangement of such as are proper for the purpose, the *spirit* of the mornings, the *excess* of noon, or the *temperance* of evening, may be improved or corrected by the application of the scene to the season.

In a *morning*, the freshness of the air allays the force of the fun-beams, and their brightness is free from glare: the most splendid objects do not offend the eye, nor suggest the idea of heat in its extreme; but they correspond with the glitter of the dew which bespangles all the produce of the earth, and with the cheerfulness diffused over the whole face of the creation. A variety of buildings may therefore be introduced to enliven the view: their colour may be the purest white, without danger of excess, though they face the eastern sun; and those which are in other aspects should be so contrived, that their turrets, their pinnacles, or other points, may catch glances of the rays, and contribute to illuminate the scene. The trees ought in general to be of the lightest greens, and so situated as not to darken much of the landscape by the length of their shadows. Vivacity in the streams, and transparency in a lake, are more important at this than at any other hour of the day: and an open exposure is commonly the most delightful, both for the effect of particular objects, and the general character of the scene.

At *noon*, every expedient should be used to correct the excess of the season. The shades are shortened, they must therefore be thick; but open plantations are generally preferable to a close covert: they afford a passage, or at least admittance to the air; which, tempered by the coolness of the place, soft to the touch, and refreshing at once to all the senses, renders the shade a delightful climate, not a mere refuge from heat. Groves, even at a distance, suggest the ideas which they realize on the spot; and, by multiplying the appearances, improve the sensations of relief from the extremity of the weather. Grottos, caves, and cells, are on the same account agreeable circumstances in a sequestered recess; and though the chill within be hardly ever tolerable, the eye catches only an idea of coolness from the sight of them. Other buildings ought in general to be cast into shade, that the glare of the reflection from them may be obscured. The large expanse of a lake is also too dazzling: but a broad river moving gently, and partially darkened with shadow, is very refreshing; more so perhaps than a little rill, for the vivacity of the latter rather disturbs the repose which generally prevails at mid-day. Every breeze then is still; the reflexion of an aspen-leaf scarcely trembles on the water; the animals remit their search of food, and man ceases from his labour: the steam of heat seems to oppress all the faculties of the mind, and all the active powers of the body; and any very lively motion discomposes the languor in which we then delight to indulge. To hear, therefore, the murmurs of a brook purling underneath a thicket, or the echo of falling waters through a wood, is more agreeable than the sight of a current; the idea conveyed by the sound is free from any agitation:

but if no other stream than a rill can be introduced, the refreshment which attends the appearance of water must not be denied to the scene.

In the *evening*, all splendor fades: no buildings glare; no water dazzles. The calmness of a lake suits the quiet of the time: the light hovers there, and prolongs the duration of day. An open reach of a river has a similar, though a fainter, effect; and a continued stream all exposed, preserves the last rays of the sun along the whole length of its course, to beautify the landscape: but a brisk current is not so consistent as a lake with the tranquillity of evening. And other objects should in general conform to the temper of the time. Buildings of a dusky hue are most agreeable to it: but a very particular effect from a setting sun will recommend those of a brighter colour; and they may also be sometimes used, among other means, to correct the uniformity of twilight. No contrast of light and shade can then be produced: but if the plantations, which by their situation are the first to be obscured, be of the darkest greens, if the buildings which have a western aspect be of a light colour, and if the management of the lawns and the water be adapted to the same purpose, a diversity of tints will be preserved long after the greater effects are faded.

THE delights, however, of the morning and evening are confined to a few months of the year; at other times, two or three hours before, and as much after, noon, are all that are pleasant; and even then the heat is seldom so extreme as to require relief from its excess. The distinctions, therefore, between the three parts of the day may in general be reckoned among the characteristics of summer. The occasional effects which by the position of objects may occur at any hour, are common to all the seasons of the year: and such as arise from the accidental colours of plants, though they are more frequent and more beautiful in one season than another, yet exist in all; and very agreeable groupings may be formed by an assemblage of them. A degree of importance may be given even to the flowers of a border, if, instead of being indiscriminately mixed, they are arranged according to their heights, their sizes, and their colours, so as to display their beauties, and to blend or contrast their varieties to the greatest advantage. The bloom of shrubs differs from that of flowers only in the scale; and the tints occasioned by the hue of the berry, the foliage, or the bark, are sometimes little inferior to bloom. By collecting into one spot such plants as have at the same time their accidental colours, considerable effects may be produced from the concurrence of many little causes.

Those which arise from bloom are the most striking, and the most certain; and they abound chiefly in the *spring*. Bloom is a characteristic of the season; and a villa near town, which is designed principally for that time of the year, is not adapted to its use if this property be not amply provided for. In such a place, therefore, shrubberies, with an intermixture of flowers, are peculiarly proper. In the summer-months, a border between the thicket and the greenward, breaks the connexion, and destroys the greater effect: it ought not to be then introduced, except to enliven small spots, and as the best species of parterre. But in the spring, the thicket is hardly formed: its principal

cial beauty is bloom; and flowers before or among the shrubs, are agreeable to the character of the season. An orchard, which, at other times, is unlightful, is then delightful; and, if a farm joins to the garden, should not be forgotten. But evergreens appear in general to great disadvantage. Most of them have a rust or a dark hue, which suffers by being contrasted to the lively verdure of the young shoots on the deciduous trees. That verdure is, however, so light, and so universal, that effects, from a mixture of greens, can seldom be produced; and those which depend on a depth of shade will often be disappointed. But buildings, views of water, and whatever tends to animate the scene, accord with the season; which is full of youth and vigour, fresh and sprightly, brightened by the verdure of the herbage and the woods, gay with blossoms and flowers, and enlivened by the songs of the birds in all their variety, from the rude joy of the sky-lark, to the delicacy of the nightingale.

In *summer*, both the buildings and the water are agreeable, not as objects only, but also as circumstances of refreshment: the pleasantness, therefore, of the rooms in the former, of the seats and the walks near the latter, is to be regarded. The plantations also should be calculated at least as much for places of retreat, as for ornaments of the view; and a continuation of shade be preserved, with very few and short interruptions, through all the parts of the garden. Communications by gravel walks are of less consequence: they do not suggest that idea of utility which attends them in winter or autumn; and their colour, which in spring is a lively contrast to the verdure through which it winds, is in the intemperate blaze of a summer day glaring and painful. They should, therefore, be concealed as much as possible; and the other considerations which belong to the noon-tide hour should be particularly attended to, at the same time that the delights of the morning and the evening are also liberally provided for. But, exclusive of all such incidental circumstances, the scenes of nature in general appear at this season to the greatest advantage: though the bloom of the spring be faded, and the verdure of the herbage may be sometimes affected by drought; yet the richness of the produce of the earth, and the luxuriance of the foliage in the woods; the sensations of refreshment, added to the beauty of water; the ideas of enjoyment which accompany the sight of every grove, of every building, and every delightful spot; the characters of rocks, heightened by their appendages, and unalloyed by any disconsolate reflections; the connexion of the ground with the plantations, the permanency of every tint, and the certainty of every effect; all concur, in summer, to raise the several compositions to their highest state of perfection.

But maturity is always immediately succeeded by decay: flowers bloom and fade; fruits ripen and rot; the grass springs and withers; and the foliage of the woods shoots, thickens, and falls. In the latter months of *autumn*, all nature is on the decline; it is a comfortless season: not a blossom is left on the shrubs or the trees; and the few flowers which still remain in the borders, dripping with wet, and sickening even as they blow, seem hardly to survive the leaves of the plant which are shrivelling beneath them. But

the change of the leaf precedes the fall; and thence results a variety of colours, superior to any which the spring or the summer can boast of. To shew and to improve that variety should be principally attended to, in a place, such as a sporting seat, which is frequented only in autumn. It appears to advantage, whenever the surface of a wood can be commanded; and it may be produced to a considerable degree, even in a shrubbery, if the plants are so disposed as to rise in gradation one behind another. By observing the tints which the leaves assume when they change, the choice may be directed to the improvement of their variety; and by attending to the times when they fall, a succession of these transitory beauties may be provided, from the earliest to the latest in the season. Many shrubs and trees are at this time also covered with berries, which furnish still further varieties of colour; both evergreens and deciduous plants abound with them; and the verdure of the former is besides a welcome substitute to that which is daily fading away. Open buildings, airy groves, views of water, and the other delights of summer, now lose their charms; and more homely circumstances of comfort and convenience are preferable to all their beauties.

A place which is the residence of a family all the year is very defective, if some portion of it be not set apart for the enjoyment of a fine day, for air, and exercise, in *winter*. To such a spot shelter is absolutely essential; and evergreens being the thickest covert, are therefore the best: their verdure also is then agreeable to the eye; and they may be arranged so as to produce beautiful mixtures of greens, with more certainty than deciduous trees, and with almost equal variety: they may be collected into a wood; and through that wood gravel-walks may be led, along openings of a considerable breadth, free from large trees which would intercept the rays of the sun, and winding in such a manner as to avoid any draft of wind, from whatever quarter it may blow. But when a retreat at all times is thus secured, other spots may be adapted only to occasional purposes; and be sheltered towards the north or the east on one hand, while they are open to the sun on the other. The few hours of cheerfulness and warmth which its beams afford are so valuable, as to justify the sacrifice even of the principles of beauty to the enjoyment of them; and therefore no objections of sameness or formality can prevail against the pleasantness of a straight walk, under a thick hedge or a fourth wall. The eye may, however, be diverted from the screen, by a border before it, where the aconite and the snowdrop, the crocus and heptaca, brought forward by the warmth of the situation, will be welcome harbingers of spring; and on the opposite side of the walk, little tufts of laurustinus, and of variegated evergreens, may be planted. The spot thus enlivened by a variety of colours, and even a degree of bloom, may be still further improved by a green-house. The entertainment which exotics afford peculiarly belongs to this part of the year; and if amongst them be interspersed some of our earliest flowers, they will there blow before their time, and anticipate the gaiety of the season which is advancing. The walk may also lead to the stoves, where the climate and the plants are always the same. And the kitchen-garden should not be far off; for that is never quite

Conclusion.

quite destitute of produce, and always an active scene: the appearance of business is alone engaging; and the occupations there are an earnest of the happier seasons to which they are preparative. By these expedients even the winter may be rendered cheerful in a place, where shelter is provided against all but the bitterest inclemencies of the sky, and agreeable objects and interesting amusements are contrived for every hour of tolerable weather.

69
Extent and
study of
gardening.

To conclude: Whatever contributes to render the scenes of nature delightful, is amongst the subjects of gardening; and animate as well as inanimate objects, are circumstances of beauty or character. Several of these have been occasionally mentioned; others will readily occur; and nothing is unworthy of the attention of a gardener, which can tend to improve his compositions, whether by immediate effects, or by suggesting a train of pleasing ideas. The whole range of nature is open to him, from the parterre to the forest; and whatever is agreeable to the senses or the imagination, he may appropriate to the spot he is to improve: it is a part of his business to collect into one place, the delights which are generally dispersed thro' different species of country.

But in this application, the genius of the place must always be particularly considered: to force it, is hazardous; and an attempt to contradict it, is always unsuccessful. The beauties peculiar to one character, cannot be transferred to its opposite: even where the characters are the same, it is difficult to copy directly

from the one into the other; and by endeavouring to produce a resemblance of a scene which is justly admired, the proper advantages of the place are often neglected for an imitation much inferior the original. The excellence of the latter probably depends on the happy application of the circumstances to the subject; and the subjects of both are never exactly alike. The art of gardening, therefore, is not to be studied in those spots only where it has been exercised; though they are in this country very numerous, and very various. Yet all together they contain but a small proportion of the beauties which nature exhibits: and unless the gardener has stored his mind with ideas from the infinite variety of the country at large, he will feel the want of that number which is necessary for choice; he will have none ready to apply to the subject immediately before him; and will be reduced to copy an imitation. But improved places are of singular use to direct the judgment in the choice, and the combinations, of the beauties of nature: an extensive knowledge of them is to be acquired in the country where they casually occur; discernment of their excellencies, and a taste for the disposition of them, is to be formed in places where they have been selected, and arranged with design.

For the particular Operations in GARDENING, see PLANTING, PRUNING, GRAFTING, INOCULATING, KITCHEN-GARDEN, ORCHARD, GREEN-HOUSE, HOT-HOUSE, INARCHING, ESPALIER, &c. and the culture and management of different plants under their respective names.

G A R

Gardiner
Garland.

GARDINER (Stephen), bishop of Winchester, and lord chancellor of England, born at Bury St Edmunds in Suffolk, natural son to Richard Woodville, brother to queen Elizabeth wife to Edward IV. was learned in the canon and civil laws, and in divinity. He signed the divorce of Henry VIII. from Katharine of Spain; abjured the pope's supremacy; and writ *De vera et falsa obedientia*, in behalf of the king: yet in Edward's reign he opposed the reformation, and was punished with imprisonment; but queen Mary coming to the throne, she enlarged him. He drew up the articles of marriage between the queen and Philip of Spain, which were very advantageous to England. He was violent against the reformers; but on his death-bed was dissatisfied with his life, and often repeated these words: *Erravi cum Petro, sed non fleui cum Petro*. He died in 1555.

GARGARISM, (from γαργαρίζω, "to wash the mouth;" a gargle. Its use is for washing the mouth and throat with, when inflammations, ulcerations, &c. are there. A small quantity may be taken into the mouth, and moved briskly about, and then spit out; or if the patient cannot do this to any advantage, the liquor may be injected by a syringe. When gargles are required, their use should be more frequently repeated than is done in common practice.

GARLAND, a sort of chaplet made of flowers, feathers, and sometimes precious stones, worn on the head, in manner of a crown.—The word is formed of the French *guirlande*, and that of the barbarous Latin *garlanda*, or Italian *ghirlanda*. Menage traces its origin from *gyrus*, through *gyrulus*, to *gyrulare*, *gyrlan-*

G A R

dum, *ghirlandum*, and at length *ghirlanda* and *guirlande*; so that *guirlande* and *garland* are descended in the sixth or seventh degree from *gyrus*.—Hicks rejects this derivation, and brings the word from *garden banda*, which in the northern languages signify a *nosegay* artfully wrought with the hand.

GARLAND also denotes ornaments of flowers, fruits, and leaves, intermixed; anciently much used at the gates of temples, where feasts and solemn rejoicings were held; or at any other place where marks of public joy or gaiety were required, as at triumphal arches, tournaments, &c.

GARLIC. See **ALLIUM**.

GARNET, in natural history, a very beautiful gem, of a red colour, with an admixture of blue.

When pure and free from blemishes, it is little inferior, in appearance, to the oriental ruby, tho' only of a middle degree of hardness between the sapphire and common crystal. It is found of various sizes, from that of a pin's head to an inch in diameter.

Among our lapidaries and jewellers, genuine garnets are known by different names according to their different degrees of colour. 1. The garnet, simply so called, is the finest and most valuable kind, being of a very deep blood-red, with a faint admixture of blue. 2. The rock-ruby, a name very improperly given to the garnet, when it is of a very strong but not deep red, and has a fairer cast of the blue: this is a very beautiful gem. 3. The *forane* or *ferain* garnet; that of a yet brighter red, approaching to the colour of native cinnamon, with a faint blue tinge. 4. The *almandine*, a garnet only a little paler than that called the

Garland
Garnet.

the rock-ruby.

Garnets are very properly distinguished into the oriental and occidental kinds, as being found in Europe as well as the East Indies. The oriental ones are principally brought from Calicut, Cananor, and Cambay; and the European ones are common in Italy, Hungary, and Bohemia.

Some authors have supposed the deeper-coloured garnet to be the same with the carbuncle of the ancients; from which it really differs; since, on receiving the sun's beams, it never gives so true a fire-colour as the carbuncle.

GARNET-COLOUR. To give this colour to glass, the workmen take equal quantities of crystal and Rochetta fritt; and to every hundred weight of this mixture they add a pound of manganese, and a pound of prepared zaffre; these are to be powdered separately, then mixed and added by degrees to the fritt while in the furnace: great care is to be taken to mix the manganese and zaffre very perfectly; and when the matter has stood 24 hours in fusion, it may be worked.

To imitate GARNETS. The making the counterfeit garnet in paste is done as follows.—Take prepared crystal two ounces, common red-lead six ounces, manganese 16 grains, zaffre three grains; mix all well, put them into a crucible, cover it with lute, and set it in a potter's kiln for 24 hours. Or take crystal two ounces, minium five ounces and a half, manganese 15 grains, zaffre four grains: mix them well together; and let all be baked, in a pot well luted, in a potter's kiln 24 hours.

GARONNE, a large river of France, which taking its rise in the Pyrenean mountains, runs north-west by the city of Tholouse, divides the provinces of Guienne and Gascony, and, visiting the city of Bourdeaux, falls into the bay of Biscay, about 60 miles below that city. It has also a communication with the Mediterranean, by means of the royal canal of Lewis XIV. The tide flows up this river 20 miles above Bourdeaux.

GARRICK (David), Esq; the great Roscius of this age and country, who for near 40 years hath shone the brightest luminary in the hemisphere of the stage, was born at the Angel Inn at Hereford, in the year 1716. His father, Captain Peter Garrick, was a French refugee, and had a troop of horse which were then quartered in that city. This rank he maintained in the army for several years, and had a majority at the time of his death; that event, however, prevented him from ever enjoying it. Mr Garrick received the first rudiments of his education at the free-school at Litchfield; which he afterwards completed at Rochester, under the celebrated Mr Colson, since mathematical professor at Cambridge. Dr Johnson and he were fellow-students at the same school; and it is a curious fact, that these two celebrated geniuses came up to London, with the intention of pushing themselves into active life, in the same coach. On the 9th of March 1736, he was entered at the honourable society of Lincoln's-Inn. The study of the law, however, he soon quitted; and followed for some time the employment of a wine-merchant: but that too disgusting him, he gave way at last to the irresistible bias of his mind, and joined a travelling company of comedians at Ipswich in Suffolk, where he went by the name of *Lyddel*. Ha-

ving in this poor school of Apollo got some acquaintance with the theatric art, he burst at once upon the world, in the year 1740-1, in all the lustre of perfection, at the little theatre in Goodman's Fields, then under the direction of Henry Giffard.

The character he first performed was Richard the Third; in which, like the sun bursting from behind a cloud, he displayed, in the earliest dawn, a somewhat more than meridian brightness. His excellence dazzled and astonished every one; and the seeing a young man, in no more than his 24th year, and a novice in reality to the stage, reaching at one single step to that height of perfection which maturity of years and long practical experience had not been able to bestow on the then capital performers of the English stage, was a phenomenon that could not but become the object of universal speculation and of as universal admiration. The theatres at the west end of the town were deserted; Goodman's Fields, from being the rendezvous of citizens and citizens wives alone, became the resort of all ranks of men; and Mr Garrick continued to act till the close of the season.

Having very advantageous terms offered him for the performing in Dublin during some part of the summer (1741), he went over thither, where he found the same just homage paid to his merit which he had received from his own countrymen. To the service of the latter, however, he esteemed himself more immediately bound; and therefore, in the ensuing winter, engaged himself to Mr Fleetwood, then manager of Drury-Lane: in which theatre he continued till the year 1745, when he again went over to Ireland, and continued there the whole season, joint manager with Mr Sheridan in the direction and profits of the theatre-royal in Smock-Alley. From thence he returned to England, and was engaged for the season of 1746 with Mr Rich at Covent-Garden. This was his last performance as an hired actor: for in the close of that season, Mr Fleetwood's patent for the management of Drury-Lane being expired, and that gentleman having no inclination further to pursue a design by which, from his want of acquaintance with the proper conduct of it, or some other cause, he had considerably impaired his fortune; Mr Garrick, in conjunction with Mr Lacy, purchased the property of that theatre, together with the renovation of the patent; and in the winter of 1747, opened it with the greatest part of Mr Fleetwood's company, and with the great additional strength of Mr Barry, Mrs Pritchard, and Mrs Cibber, from Covent-Garden.

In this station Mr Garrick continued till his retirement in the spring of 1776; and both by his conduct as a manager, and his unequalled merit as an actor, from year to year added to the entertainment and consulted the taste of the public with the greatest assiduity. They were grateful in their acknowledgments; and by a well-deserved and warm encouragement, raised him to a state of fame, ease, and affluence, which he enjoyed for many years.

Were we to trace Mr Garrick through the several occurrences of his life,—a life so active, so busy, and so full of occurrences as his, we should swell this account to many pages. Suffice it to say, he continued in the unmoiled enjoyment of his fame and unrivalled excellence to the moment of his retirement. His universality

fality of excellence was never once attacked by competition. Tragedy, comedy, and farce, the lover and the hero, the jealous husband who suspects his wife without cause, and the thoughtless lively rake who attacks it without design, were all alike his own. Rage and ridicule, doubt and despair, transport and tenderness, compassion and contempt; love, jealousy, fear, fury, and implicit; all took in turn possession of his features, while each of them in turn appeared to be the sole possessor of his heart. In the several characters of Lear and Hamlet, Richard, Dorilas, Romeo, and Luſignane; in his Ranger, Bayes, Druggier, Kiteley, Brute, and Benedick, you ſaw the muscular conformation that your ideas attached to them all. In ſhort, nature, the miſtreſs from whom alone this great performer borrowed all his leſſons, being in herſelf inexhauſtible, this her darling ſon, marked out for her trueſt repreſentative, found an unlimited ſcope for change and diverſity in his manner of copying from her various productions. There is one part of theatrical conduct which ought unqueſtionably to be recorded to Mr Garrick's honour, ſince the cauſe of virtue and morality, and the formation of public manners, are conſiderably dependent upon it; and that is, the zeal with which he aimed to baniſh from the ſtage all thoſe plays which carry with them an immoral tendency, and to prune from thoſe which do not abſolutely, on the whole, promote the intereſts of vice, ſuch ſcenes of licentiousneſs and liberty, as a redundancy of wit and too great livelineſs of imagination have induced ſome of our comic writers to indulge themſelves in, and which the ſympathetic diſpoſition of our age of gallantry and intrigue has given ſanction to. The purity of the Engliſh ſtage has certainly been much more fully eſtabliſhed during the adminiſtration of this theatrical miniſter, than it had ever been during preceding managements. He ſeems to have carried his model, moral, chaſte, and pious principles with him into the very management of the theatre itſelf, and reſcued performers from that obloquy which ſtuck on the profeſſion. Of thoſe who were accounted blackguards, unworthy the aſſociation of the world, he made gentlemen, united them with ſociety, and introduced them to all the domeſtic comforts of life. The theatre was no longer eſteemed the receptacle of all vice; and the moral, the ſerious, the religious part of mankind did not hesitate to partake of the rational entertainment of a play, and paſs a cheerful evening undiſguſted with the licentiousneſs, and uncorrupted by the immorality, of the exhibition.

Notwithſtanding the numberleſs and laborious avocations attendant on his profeſſion as an actor, and his ſtation as a manager; yet ſtill his active genius was perpetually buſying forth in various little productions in the dramatic and poetical way, whoſe merit cannot but make us regret his want of time for the purſuance of more extenſive and important works. It is certain, that his merit as an author is not of the firſt magnitude: but his great knowledge of men and manners, of ſtage-eſſect, and his happy turn for lively and ſtriking ſatire, made him generally ſucceſſful; and his prologues and epilogues in particular, which are almoſt innumerable, poſſeſs ſuch a degree of happineſs, both in the conception and execution, as to ſtand unequalled. His Ode on the death of Mr Pelham run through four edi-

tions in leſs than fix weeks. His Ode on Shakeſpeare is a maſterly piece of poetry; and when delivered by himſelf, was a moſt capital exhibition. His alterations of Shakeſpeare and other authors have been at times ſucceſſful, and at times exploded. The cutting out the grave-diggers ſcene from Hamlet will never be forgot to him by the inhabitants of the gallery at Drury. Though neceſſary to the chaſteneſs of the ſcene, they cannot bear to loſe ſo much true ſterling wit and humour; and it muſt be owned, that exuberances of that kind, though they hurt the uniformity, yet increaſe the luxuriance of the tree. Among his alterations the following are part: Every Man in his Humour, altered from Ben Johnſon; Romeo and Juliet, Winter's Tale, Catherine and Petruchio, Cymbeline, Hamlet, &c. altered and made up from Shakeſpeare; Gameſters, a comedy, from Shirley; Iſabella, from Southerne. To theſe we add, as original productions, The Farmer's Return, and Linceo's Travels, interludes; Guardian, Lethe, Lying Valet, Miſs in her Teens, Male Coquet, Iriſh Widow, and other comedies in two acts; Enchanter, a muſical entertainment; Lilliput; the Chriſtmas Tale is aſcribed to him, and many others. At this time a complete edition of his works is preparing for the preſs, under the direction of his friends, and in which the whole will be aſcertained.

We now bring him to the period of his retirement in the ſpring of 1776; when, full of fame, with the acquirement of a ſplendid fortune, and growing into years, he thought proper to ſeek the vale of life, to enjoy that dignified and honourable eaſe which was compatible with his public ſituation, and which he had ſo well earned by the activity and the merits of his dramatic reign. But very ſhort, indeed, was the period allotted to him for this precious enjoyment: for on the 20th day of January 1779, he departed this life; leaving no one rival in excellence upon earth to compenſate for his loſs, or a hope of our ever meeting with his like again.

GARRISON, in the art of war, a body of forces, diſpoſed in a fortrefs, to defend it againſt the enemy, or to keep the inhabitants in ſubjection; or even to be ſubſtituted during the winter-ſeaſon: hence, *garrison* and *winter-quarters* are ſometimes uſed, indifferently, for the ſame thing; and ſometimes they denote different things. In the latter caſe, a *garrison* is a place wherein forces are maintained to ſecure it; and where they keep regular guard, as a frontier town, a caſtle, caſtle, tower, &c. The *garrison* ſhould be always ſtronger than the townſmen.

Du Cange derives the word from the corrupt Latin *garniſo*, which the latter writers uſe to ſignify all manner of munition, arms, victuals, &c. neceſſary for the defence of a place, and ſuſtaining of a ſiege.

Winter-quarters ſignify a place where a number of forces are laid up in the winter ſeaſon, without keeping the regular guard.

GARTER, a ligature for tying up the ſtockings; but particularly uſed for the badge of a noble order of knights, hence denominated the

Order of the GARTER, a military order of knighthood, the moſt noble and ancient of any lay-order in the world, inſtituted by Edward III. This order conſiſts of 26 knights-companions, generally princes and peers,

peers, whereof the king of England is the sovereign or chief. They are a college or corporation, having a great and little seal.

Their officers are a prelate, chancellor, regifter, king at arms, and usher of the black rod. They have also a dean with 12 canons, and petty canons, vergers, and 26 pensioners or poor knights. The prelate is the head. This office is vefted in the bifhop of Winchester, and has ever been fo. Next to the prelate is the chancellor; which office is vefted in the bifhop of Salifbury, who keeps the feals, &c. The next is the regifter, who by his oath is to enter upon the regiftry, the ferutinies, elections, penalties, and other acts of the order, with all fidelity. The fourth officer is Garter and King-at-arms, being two diftinct offices united in one perfon. Garter carries the rod and fceptre at the feaft of St George, the protector of this order, when the fovereign is prefent. He notifies the elections of new knights, attends the folemnity of their installations, carries the garter to the foreign princes, &c. He is the principal officer within the college of arms, and chief of the heralds. See KING at Arms.

All thefe officers, except the prelate, have fees and penfions. The college of the order is feated in the caftle of Windfor, with the chapel of St George, and the charter-houfe, erected by the founder for that purpofe. The habit and enfign of the order are, a garter, mantle, cape, george, and collar. The four firft were affigned the knights-companions by the founder; and the george and collar by Henry VIII. The garter (Plate CXV. fig. 2. N^o 1.) challenges pre-eminence over all the other parts of the drefs, by reafon that from it the noble order is denominated; that it is the firft part of the habit prefented to foreign princes, and abfent knights, who, and all other knights-eleft, are therewith firft adorned; and it is of fo great honour and grandeur, that by the bare inveftiture with this noble enfign, the knights are e-ftimated companions of the greateft military order in the world. It is worn on the left leg between the knee and calf, and is enamelled with this motto, HONI SOIT QVI MAL Y PENSE; i. e. *Shame to him that thinks evil hereof*: The meaning of which is, that king Edward having laid claim to the kingdom of France, retorted shame and defiance upon him that fould dare to think amifs of the juft enterprife he had undertaken, for recovering his lawful right to that crown; and that the bravery of thofe knights whom he had elefted into this order, was fuch as would enable him to maintain the quarrel againft thofe that thought ill of it.

The mantle (*ibid.* N^o 2.) is the chief of thefe veftments made ufe of upon all folemn occafions. The colour of the mantle is by the ftatutes appointed to be blue. The length of the train of the mantle only diftinguifhes the fovereign from the knights-companions. To the collar of the mantle is fixed a pair of long fringes, anciently wove with blue filk only, but now twifted round, and made of Venice gold and filk, of the colour of the robe, with knobs, or buttons, and raffels at the end. The left foulder of the mantle has, from the institution, been adorned with a large garter, with the device, HONI SOIT, &c. Within this is the crofs of the order, which was ordained to be

worn at all times by king Charles I. At length the ftar was introduced, being a fort of crofs irradiated with beams of filver; (*ibid.* N^o 3.)

The collar (*ibid.* N^o 4.) is appointed to be composed of pieces of gold in falhion of garters, the ground enamelled blue, and the motto gold.

The manner of elefting a knight-companion into this moft noble order, and the ceremonies of inveftiture, are as follow. When the fovereign defigns to eleft a companion of the garter, the chancellor belonging to this order draws up the letters, which, paffing both under the fovereign's fign-manual and fignet of the order, are fent to the perfon by Garter principal king at arms; and are in this manner, or to the fame effect: "We, with the companions of our moft noble order of the garter, affembled in chapel, holden this prefent day at our caftle at Windfor, confidering the virtuous fidelity you have fhewn, and the honourable exploits you have done in our fervice, by vindicating and maintaining our right, &c. have elefted and chofen you one of the companions of our order. Therefore, we require you to make your fpeedy repair unto us, to receive the enfigns thereof, and be ready for your installation upon the — day of this prefent month, &c."

The garter, which is of blue velvet bordered with fine gold-wire, having commonly the letters of the motto of the fame, is, at the time of election, buckled upon the left leg, by two of the fenior companions, who receive it from the fovereign, to whom it was prefented upon a velvet cuftion, by Garter king at arms, with the ufual reverence, whilft the chancellor reads the following admonition, enjoined by the ftatutes: "To the honour of God omnipotent, and in memorial of the bleffed martyr St George, tie about thy leg, for thy renown, this noble garter; wear it as the fymbol of the moft illuftrious order, never to be forgotten or laid afide; that thereby thou mayeft be admonifhed to be courageous; and, having undertaken a juft war, in which thou fhalt be engaged, thou mayeft ftand firm, valiantly fight, and fucceffively conquer."

The princely garter being then buckled on, and the words of its fignification pronounced, the knight-eleft is brought before the fovereign, who puts about his neck, kneeling, a fky-coloured ribbon, (*ibid.* N^o 5.) whereunto is appendant, wrought in gold within the garter, the image of St George on horfeback, with his fword drawn, encountering with the dragon. In the mean time the chancellor reads the following admonition: "Wear this ribbon about thy neck, adorned with the image of the bleffed martyr and foldier of Chrift, St George, by whose imitation provoked, thou mayeft fo overpafs both prosperous and adverfe adventures, that having floutly vanquifhed thy enemies both of body and foul, thou mayeft not only receive the praife of this tranfient combat; but be crowned with the palm of eternal victory."

Then the knight elefted kifles the fovereign's hand; thanks his majefty for the great honour done him; rifes up, and falutes all the companions feverally, who return their congratulations. N^o 2. (*ibid.*) exhibits a view of a knight of the garter in the habit of this order.



Garth.

Since the institution of this order, there have been eight emperors and twenty-eight kings, besides numerous sovereign princes, enrolled as companions thereof. Its origin is somewhat differently related. The common account is, that the countess of Salisbury at a ball happening to drop her garter, the king took it up and presented it to her with these words, "*Honni soit qui mal y pense*;" i. e. Evil to him that evil thinks. This accident, it is said, gave rise to the order and the motto; it being the spirit of the times to mix love and war together: but as in the original statutes of this order there is not the least conjecture to countenance such a feminine institution, credit cannot be given to this tradition: the true motive is therefore attributed by very respectable historians, to a nobler origin; which is, that king Edward III. having issued forth his own garter for the signal of a battle, it ended so fortunately, that he thence took occasion to institute that order, not only as an incentive to honour and martial virtue, but also as a symbol of unity and society.

GARTH (Sir Samuel), an excellent English poet and physician, was descended from a good family in Yorkshire. He was admitted into the college of physicians at London in 1693. He at that time zealously promoted and encouraged the erecting of the dispensary for the relief of the sick poor, by giving them advice gratis, and medicines at low rates. This work of charity having exposed him and many other physicians to the envy and resentment of several persons of the same faculty as well as apothecaries, he ridiculed them, with a peculiar spirit and vivacity, in a poem called the *Dispensary*, in six cantos, highly esteemed. He was one of the most eminent members of the famous society called the *Kit-Kat Club*, which consisted of noblemen and gentlemen distinguished by their excellent parts and affection to the house of Hanover. Upon the accession of George I. he was knighted, and made physician in ordinary to his majesty, and physician-general to the army. Nor were these more than just rewards even of his physical merit. He had gone through the office of censor of the college in 1702; and had practised always with great reputation, and a strict regard to the honour and interest of the faculty, never stooping to prostitute the dignity of his profession, through mean and sordid views of self-interest, to any, even the most popular and wealthy apothecaries. In a steady adherence to this noble principle, he concurred with the much celebrated Dr Radcliffe, with whom he was also often joined in physical consultations. He had a very extensive practice, but was very moderate in his views of advancing his own fortune; his humanity and good-nature inclining him more to make use of the great interest he had with persons in power, for the support and encouragement of other men of letters. He chose to live with the great in that degree of independency and freedom, which became a man possessed of a superior genius, whereof he was daily giving fresh proofs to the public. One of his last performances in polite letters, was his translation of the whole fourteenth book, and the story of Cincinnatus in the fifteenth book, of Ovid's *Metamorphoses*. These, together with an English version of the rest, were published in 1717; and he has prefixed an excellent preface to the whole, wherein

he not only gives an idea of the work, and points out its principal beauties, but shews the uses of the poem, and how it may be read to most profit. The distemper which seized him the ensuing year, and ended not but with his life, caused a general concern; which was particularly testified by lord Landford, brother-poet, though of a different party, in some admirable verses written on the occasion. He died, after a short illness which he bore with great patience, in January 1719.

GAS, the name given by Van Helmont, and after him by other chemists, to those elastic fluids extricated from different terrestrial substances, and which are not condensable by cold. Of these a good number have been observed by Van Helmont: such as, the *gas ventosum*, or atmospheric air; the *gas sylvestre*, or fluid extricated during fermentations and effervescences, called by later authors, *fixed*, *facillitour*, and *fixable* air; *gas pingue*, or the fluid expelled from inflammable substances by heat; *gas flammium*, or the fluid produced in the deflagration of nitre. To these other authors have added *inflammable* air or *gas*, *nitrous acid* *gas*, *marine* *gas*, *alkaline* *gas*, &c.

An account of the most remarkable properties of all these different fluids is given under the articles AIR, CHEMISTRY, DAMPS, &c. Of their composition very little is known with certainty. Dr Priestley some time ago discovered a method of procuring very pure atmospheric air from a mixture of nitrous acid with red lead, or with any dephlogisticated earth, as related under the article AIR, n° 44. Hence he concluded, that the nitrous acid, and likewise earth, entered into the composition of the air we breathe. The proofs of this, however, from subsequent experiments, seem to be but slightly founded. It is certain, that part of the earth, which in Dr Priestley's first experiments was thought to enter into the composition of his dephlogisticated air, was afterwards found to separate from it, and to have been elevated merely by the force of the air extricating itself from the terrestrial substance. With respect to the acid, the case is still more dubious. It was found that dephlogisticated air might be procured from red-lead and oil of vitriol; to which purpose the following experiment is recorded in the Appendix to the Chemical Dictionary. "Forty-eight pennyweights of red-lead were put into a long necked retort, the contents of which were ten cubic inches; and upon this red-lead, 24 pennyweights of oil of vitriol were poured. The nose of the retort was then immersed under water, and over it an inverted jar filled with water was placed. The mixture of oil of vitriol and red-lead became very hot, and ten cubic inches of air were soon thrown into the jar without the application of external heat. Upon applying the flame of a lamp to the bottom of the retort, bubbles of air passed copiously into the jar, which were successively changed, that the air received at different times of the operation might be examined. The quantity of air which had been expelled from the above mixture of red-lead and vitriolic acid, was found to be 36 cubic inches, after the proper allowances for the air contained in the retort had been made; and this air was found to have all the properties of that procured by Dr Priestley from nitrous acid and red lead."

From some late experiments made by Dr Priestley him-

Gas.

Fig. 1. SEA GAGE.



Fig. 5.
GRYLLUS LAURICOLUS



Fig. 4.
GRYLLUS ACUMINATUS



Fig. 6.
GRYLLUS GRYLLOTALEA



Fig. 2. Order of the GARTER.



N. 2.



N. 3.



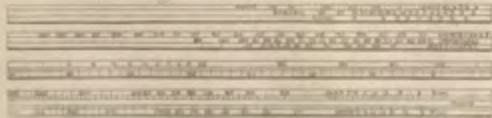
N. 1.

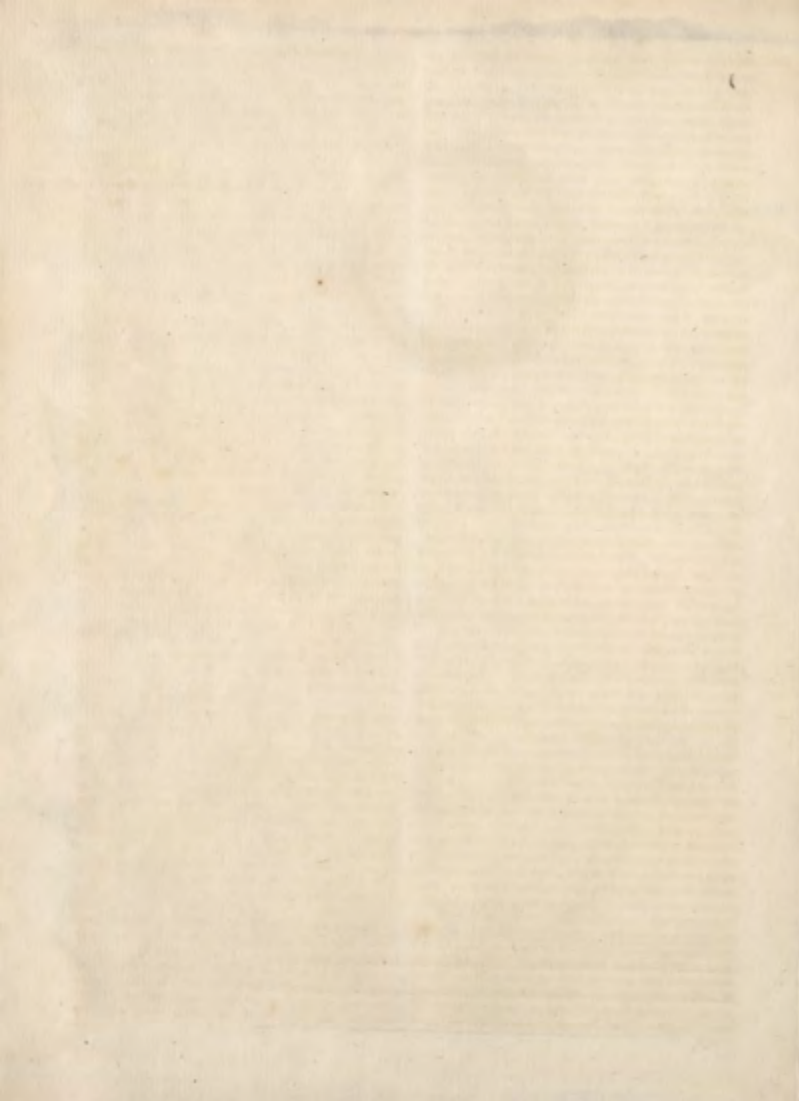


N. 4.



Fig. 3. GAUGING ROD.





himself, it appears, that very pure air may be obtained by means of the vitriolic acid, or indeed without any acid at all. In the course of his experiments, the doctor found, that dephlogisticated air might be obtained from the green, blue, and white vitriols. Suspecting, however, the purity of these vitriols which were prepared by others, he prepared some green vitriol himself by dissolving clean iron-sfilings in the vitriolic acid diluted with water. Distilling the matter in a retort, he had the same results as before; the dephlogisticated air which came over last, being very turbid, and exceedingly pure.—He now suspected the purity of his oil of vitriol, which at present is generally procured from sulphur with the addition of nitre. He therefore next employed the vitriolic acid prepared in Neumann's manner, in which no nitre is used: but dephlogisticated air was still produced from the combination of iron filings with this purer acid. And lest the mixture of these two substances might be suspected of having attracted pure air, in consequence of their exposure to the atmosphere during their combination, he conducted the experiment in the following scrupulous manner. He dissolved five pennyweights one grain of iron in a sufficient quantity of pure oil of vitriol which had been carefully prepared for this purpose by Mr Winch, so as to be free from any admixture of the nitrous acid. The distillation was performed in the same retort in which the solution had been made, and in the continuation of the same process; so that all communication with the external air was most effectually prevented. Conducting the process with these attentions, and distilling the matter to dryness, the succeeding products were, first, the common air a little phlogisticated; then a little fixed air, and much vitriolic-acid air; and lastly, a considerable quantity of dephlogisticated air. The residuum still weighed more than the iron filings employed; and had the heat been increased, more air might perhaps have been procured.

Adding fresh oil of vitriol to this residuum, and treating it as before, but in a gun-barrel, a still larger quantity of dephlogisticated air was produced; so that the oil of vitriol appeared capable of generating dephlogisticated air as often as it was mixed with iron, as well as the nitrous acid when mixed with red-lead, &c. in his former experiments.

On putting an ounce of manganese into a small retort, with a very long narrow neck, and exposing it to a red sand-heat, 40 ounce-measures of air were expelled in different portions. Part of this, in every portion, was fixed air, and at first almost wholly so: but four-fifths of the last produce was the purest dephlogisticated air. From an ounce of calaminaris without addition, 316 ounce-measures of gas were expelled by a red heat: the whole of this, however, was fixed air, except about four ounce-measures, which were nearly as good as common air.

In making some experiments on vegetation, the doctor discovered, that dephlogisticated air was in some cases produced naturally. Having observed bubbles of air that seemed to issue spontaneously from the roots of several plants growing in water, he was at first led to suspect that this air had percolated through the plant; which had probably seized upon and retained the phlogiston of the air, and then emitted the purer

part. He found this conjecture verified with regard to the purity of the air; for, on examining some of it, he found that one measure of it, and one of nitrous air, occupied the space only of one measure.—Soon after, he found that the plants had no share in the production of this air; for, on taking them out of the vials, the remaining water continued to emit air as plentifully as when they were growing in it. He observed too, that the vials and other vessels in which this pure air had been emitted from the water had their bottoms and sides more or less covered with a green matter, from which the air evidently seemed to proceed. It appeared to him, however, that this green matter could neither be of an animal nor vegetable nature; but that it was a substance *sui generis*; and that neither the external air nor animalcules could have any share in the formation of it: for it was produced in vials closely corked, and in the middle vessel of Mr Parker's apparatus*. But from some experiments made by others, it appears that the green matter will not be deposited in vials closely corked, unless some air is included; and the quantity of the deposit bears some proportion to that of the air left in the vial. In open vials completely filled, and inverted in water, the water contained in the vials has an intermediate communication with the atmosphere, and the process goes on as described above: but if that communication is stopped from the beginning, by inverting the vials in quicksilver (a fluid impermeable to air), no green matter or pure air is produced.

On filling a number of vials with different kinds of water, as river-water, rain-water, pump-water, which contained a considerable quantity of fixed air, he found that no green matter was produced in any of them, except in those which contained the pump-water. Afterwards, however, he found that both the green matter and pure air was produced in great plenty from water strongly impregnated with fixed air.—One measure of the purest air he ever obtained in this way, when mixed with two measures of nitrous air, occupied the space only of 0.44 of a measure; “which (says Dr Priestley) is quite as pure as dephlogisticated air is, at a medium.”

The most remarkable circumstance in this production of air is the instrumentality of the sun's *light* independent of his mere *heat*. Concerning this, the doctor has the following observations:

“Whatever air is naturally contained in water, or in substances dissolved in water, as calcareous matter, &c. becomes, after long standing, but especially when exposed to the sun, depurated, so as at length to become absolutely dephlogisticated; and that this air, being continually emitted by all water exposed to the action of the sun's rays, must contribute to the melioration of the state of the atmosphere in general.

“When water has been long kept in the shade, it has not generally yielded any other kind of air than it would have yielded at first; and though, when kept in an open vessel, the air has been better, it has never been so good as when exposed a much shorter time to the sun.

“No degree of warmth will supply the place of the sun's light: and though, when the water is once prepared by exposure to the sun, warmth will suffice to expel that air; yet, in this case, the air has never

* See Air,
10th S3.

Gas
Gascogne.

been so pure as that which has been yielded spontaneously, without additional heat. The reason of this may be, that, besides the air already depurated, and on that account ready to quit its union with the water, heat expels, together with it, the air that was phlogisticated, and held in a closer union with the water; which air, the *action of light*, whatever that is, would in time have depurated also.

“The quantity of air yielded by water spontaneously, far exceeds that which can be expelled from it by heat. If the water naturally contains fixed air, yet, in consequence of this exposure to the sun’s light, it is all dissipated, and the natural residuum of it becomes pure dephlogisticated air. For no fixed air at all, but the purest dephlogisticated air is at length procured from it; and water impregnated with fixed air yields, after this exposure, the greatest quantity of dephlogisticated air.” From some experiments made by Dr Dobson of Liverpool, and Mr Becket of Bristol, it appears that air purer than the common atmosphere can be extracted from sea-water, and the water of the hot well at Bristol.

A new species of inflammable gas has been discovered by Dr Ingenhousz. This is procured by putting a single drop of vitriolic ether into an inflammable air-pistol, containing about ten cubic inches: it communicates to the common air contained in the pistol, a strong explosive force. It is very remarkable, that the gravity of this inflammable gas exceeds that extracted from iron, in the proportion of 150 to 25. It is even heavier than common air, in the proportion of 150 to 138: so that, if too great a quantity of it contained in the air-pistol, and the consequent exclusion of too much of the common air, prevent it from taking fire, it will fall out, on holding the pistol a few seconds inverted, with its mouth open; and, in consequence of the entrance of a proper quantity of common air in its room, the explosion will take place.—Another very remarkable circumstance is, that though ether itself is so very volatile, and evaporates so quickly; yet this elastic vapour, generated from it, will remain some hours in an open glass, without such diminution from evaporation, or its mixing with the atmosphere, as to destroy its inflammable quality.

From these experiments we cannot conclude any thing with certainty. They only evince, in one case, the transmutation of the *gas sylvestre* of Helmont, our fixed air, into atmospheric air. With regard to this last, it seems also to be pretty plain, that, in some cases, the element of *fire*, in others that of *light*, enters largely into its composition. But whether these elements are, in such cases, combined with any part of the terrestrial matter, or whether they are only new-modelled by some different arrangement of their parts, must be determined by future experiments.

GASCOIGNE (Sir William), chief justice of the court of king’s bench under Henry IV. A most learned and upright judge who, being insulted on the bench by the then prince of Wales, afterwards Henry V. with equal intrepidity and coolness committed the prince to prison; and by this seasonable fortitude, laid the foundation of the future glory of that great monarch, who, from this event, dated his reformation from the licentiousness of his youth. It is not well authenticated that the prince struck Sir William,

as recorded by Shakespeare; but all authors agree, Gascoigne that he interrupted the course of justice, to screen a low servant. Sir William died in 1413.

GASCOIGNE (George), an English poet of some fame in the early part of the reign of Queen Elizabeth, was born at Walthamstow in Essex, of an ancient family, and educated at both universities, but principally at Cambridge. From thence he removed to Gray’s Inn, and commenced student of the law; but, having a genius too volatile for that study, he travelled abroad, and for some time served in the army in the Low Countries. He afterwards went to France; where he became enamoured of a Scottish lady, and married her. Being at length, says Wood, *weary of those vanities*, he returned to England; and settled once more in Gray’s Inn, where he wrote most of his dramatic and other poems. The latter part of his life he spent in his native village of Walthamstow, where he died in the year 1578. He had the character of a polite gentleman, an eloquent and witty companion, *et vir inter poetas sui seculi præstantissimus*. His plays, first printed separately, were afterwards, with several other poems, &c. reprinted in two volumes 4to. the first volume in 1577, the second in 1587.

GASCOIN, or GASCOIGN, denotes the hinder thigh of a horse, which begins at the stifle, and reaches to the ply or bending of the ham.

GASCONADE, a boast or vaunt of something very improbable. The term has its rise from the Gascons, or people of Gascony in France, who it seems have been distinguished for bragging and rhodomontado.

GASCONY, the most south-west province of France, is bounded by Guienne on the north, by Languedoc on the east, by the Pyrenees which separate it from Spain on the south, and by the bay of Biscay on the west. It had its name from the ancient inhabitants called *Gascones*, or *Vascones*; by the moderns *Basques*, or *Vasques*. After these were subdued by the Franks, they had for some time dukes of their own, who were subject to the dukes of Aquitaine; but both were at last dispossessed by the kings of France. The country produces corn, wine, fruits, tobacco, hemp, brandy, prunes, &c. The inhabitants are noted for a corrupt and vicious pronunciation of the French tongue, as well as their vain-glorious boasting.

GASSENDI (Peter), one of the most celebrated philosophers France has produced, was born at Chanterrier, about three miles from Digne in Provence, in 1592. When a child, he took particular delight in gazing at the moon and stars, as often as they appeared in clear unclouded weather. This pleasure frequently drew him into bye-places, in order to feast his eye freely and undisturbed; by which means his parents had him often to seek, not without many anxious fears and apprehensions. They therefore put him to school at Digne; where, in a short time, he made such an extraordinary progress in learning, that some persons, who have seen specimens of his genius, resolved to have him removed to Aix, in order to study philosophy under Feytaud, a learned minor friar. This proposal was so disagreeable to his father, who intended to breed him up in his own way to country-business, as being more profitable than that of a scholar, that he would consent to it only upon condition that he should

return

return home in two years at farthest. Accordingly young Gassendi, at the end of the appointed time, repaired to Chanterfer: but he had not been long there, when he was invited to be professor of rhetoric at Digne, before he was quite 16 years of age; and he had been engaged in that office but three years, when his master Felay dying, he was made professor in his room at Aix. When he had been there a few years, he composed his *Paradoxical Exercitations*; which, coming to the hands of Nicholas Peirese, that great patron of learning joined with Joseph Walter prior of Valette in promoting him; and he, having entered into holy orders, was first made canon of the church of Digne and doctor of divinity, and then obtained the wardenship or rectorship of that church. Gassendi's fondness for astronomy grew up with his years; and his reputation daily increasing, he was, in 1645, appointed royal professor of mathematics at Paris. This institution being chiefly designed for astronomy, our author read lectures on that science to a crowded audience. However, he did not hold this place long; for a dangerous cough and inflammation of the lungs obliged him, in 1647, to return to Digne for the benefit of his native air.—Gassendi wrote against the metaphysical meditations of Des Cartes; and divided with that great man the philosophers of his time, almost all of whom were Cartesian or Gassendians. He joined to his knowledge of philosophy and the mathematics, an acquaintance with the languages and a profound erudition. He wrote, 1. Three volumes on Epicurus's Philosophy; and six others, which contain his own philosophy. 2. Astronomical works. 3. The lives of Nicholas de Peirese, Epicurus, Copernicus, Tycho Brahe, Peurbachius, and Regiomontanus. 4. Epistles, and other treatises. All his works were collected together, and printed at Lyons in 1658, in six volumes folio. He died at Paris in 1655, aged 63.

GASTEROSTEUS, the STICKLE-BACK, in ichthyology, a genus of fishes belonging to the order of thoracici. There are three rays in the membrane of the gills; the body is carinated; and there are some distinct prickles before the back-fin. There are 11 species distinguished by the number of prickles on the back. One of these species, the aculeatus, stickleback, bankie, or sharpling, is common in many of the British rivers. In the fens of Lincolnshire, and some rivers that proceed from them, they are found in prodigious quantities. At Spalding there are, once in seven or eight years, amazing shoals that appear in the Welland, and come up the river in form of a vast column. They are supposed to be the multitudes that have been washed out of the fens by the floods of several years, and collected in some deep hole, till, overcharged with numbers, they are periodically obliged to attempt a change of place. The quantity is so great, that they are used to manure the land, and trials have been made to get oil from them. A notion may be had of this vast shoal, by being informed, that a man being employed by the farmer to take them, has got for a considerable time four shillings a-day by felling them for a half-penny per bushel.—This species seldom reaches the length of two inches; it hath three sharp spines on the back, that can be raised or depressed at pleasure. The colour of the back and sides is an olive-green; the belly white; but in some the lower jaws and belly are of

a bright crimson.

GAST-HOUND. See GAZE-HOUND.

GASTRELL (Francis), bishop of Chester, was born in 1662, appointed preacher to the society of Lincoln's Inn in 1694, and made bishop of Chester in 1714. He preached a course of sermons for Boyle's lectures; engaged in the Trinitarian controversy with Mr Collins and Dr Clarke; and published two excellent pieces, the one intitled, *Christian Institutes*, and the other, *A moral proof of a future state*. He vindicated the rights of the university of Oxford, against the archbishop of Canterbury, in the appointment of the warden of Manchester college; and opposed the violent proceedings against bishop Atterbury in the house of lords, though he disliked the bishop as a man of arbitrary principles. He died in 1725.

GASTRIC, in general, something belonging to the stomach.

GASTRIC Juice, a thin pellucid liquor, which distills from certain glands in the stomach, for the dilution, &c. of the food.

From some late experiments it appears, that this juice is the chief instrument of digestion; but in what manner this operation is performed by it, remains yet a secret. It is not possessed of any corrosive acrimony, for this would act upon all substances indiscriminately; but the gastric juice is found to act only upon particular substances. The most remarkable particularity of this kind is, that though it very readily dissolves animal substances when deprived of the vital principle, it absolutely refuses to touch those which are alive. This would seem to favour the opinion formerly in vogue, that digestion was performed by means of a kind of fermentation induced into the substances swallowed for food; as very probably the parts of living animals may be capable of resisting those fermentations which readily take place in dead ones. But whether or not this is the case, must be determined by future experiments.

GASTROCNEMIUS, in anatomy. See ANATOMY, *Table of the Muscles*.

GASTROMANCY, a method of divination by water, practised by the ancient Greeks. See DIVINATION.

GASTRORAPHY, in surgery, the operation of sewing up wounds of the abdomen. See SURGERY.

GATE, in architecture, a large door, leading or giving entrance into a city, town, castle, palace, or other considerable building; or a place giving passage to persons, horses, coaches, or waggons, &c. As to their proportion, the principal gates for entrance thro' which coaches and waggons are to pass, ought never to be less than seven feet in breadth, nor more than 12, which last dimension is fit only for large buildings. The height of a gate is to be $\frac{1}{2}$ of the breadth, and somewhat more; but as for common gates in inns, under which waggons go loaded with hay, straw, &c. the height of them may be twice their breadth. See ARCHITECTURE.

GATES of Hell. This expression is used in scripture, to denote figuratively, either the *grave*, or the *powers of darkness*, i. e. the devil and his angels.

The Mahometans use the expression literally, and suppose that hell has seven gates. The first is that where Mussulmans, who incur the guilt of sin, will be tormented. The second is for the Christians. The

Gataker,
Gauden.

third is for the Jews. The fourth for the Sabians. The fifth for the Magians, or worshippers of fire. The sixth for Pagans and idolaters. And the seventh for hypocrites, who make an outward shew of religion, but have none.

GATAKER (Thomas), a learned critic and divine, was born at London in 1574, and studied at St John's college, Cambridge. He was afterwards chosen preacher at Lincoln's Inn; which he quitted in 1611, for the rectory of Rotherhithe in Surry. In 1620, he made a tour through the Low Countries; and, in 1624, published at London a book intitled, "Transubstantiation declared by the confession of the Popish writers to have no necessary foundation in God's word:" he wrote likewise a defence of this discourse. In 1642, he was appointed one of the assembly of divines, and was engaged with them in writing annotations upon the bible. He died in July 1654, in the 80th year of his age. Besides the above works, he published, 1. A dissertation upon the style of the New Testament. 2. *De nomine tetragrammata*. 3. *De diphthongis, five bisocalibus*. 4. An edition and translation of the emperor Marcus Antoninus's meditations. 5. A collection of sermons, in folio; and many other works. His piety and charity were very exemplary; and his modesty so great, that he declined all ecclesiastical dignity and court-preferments. His extensive learning was admired by Salmasius and other great men abroad; his house was a private seminary for young gentlemen of this nation, and many foreigners resorted to him to receive advice in their studies.

GAUDEN (Dr Joseph), son of John Gauden vicar of Mayfield in Essex, was born there in 1605. At the commencement of the civil war, he was chaplain to Robert earl of Warwick; who taking part with the parliament against the king, was followed by his chaplain. Upon the establishment of the presbyterian model of church-government, he complied with the ruling powers, and was nominated one of the assembly of divines who met at Westminster in 1643, and took the covenant; yet having offered some scruples and objections to it, his name was afterward struck out of the list. Nor did he espouse the parliament-cause any longer than they adhered to their first avowed principles of reforming only, instead of destroying, monarchy and episcopacy. In this spirit he was one of those divines who signed a protestation to the army, against the violent proceedings that affected the life of the king; and a few days after his execution published the famous *EVANGELIUM*, *A Portraiture of his sacred Majesty in his solitude and sufferings*; which ran through 50 editions in the course of a year. Upon the return of Charles II. he was promoted to the see of Exeter; and in 1662 was removed to Worcester, much to his regret, having flattered himself with the hopes of a translation to Winchester: and his death happened the same year. He wrote many controversial pieces suited to the circumstances of the times, and to his own views from them.—The *Eikon Basilike* above mentioned he published as the king's private meditations; though on this point there has been a long controversy. After the bishop's death, his widow, in a letter to one of her sons, calls it "The Jewel;" and said, her husband had hoped to make a fortune by it; and that she had a letter of a very great man's, which would

clear up that he writ it. This assertion, as the earl of Clarendon had predicted, was eagerly espoused by the anti-royalists, in the view of disparaging Charles I. But it has been observed, that Gauden had too luxurious an imagination, which betrayed him into a rankness of style in the Abiatic way; and from thence, as bishop Burnet argues with others, it may be certainly concluded, that not he, but the king himself, was the true author of the *EVANGELIUM*; in which there is a nobleness and justness of thought, with a greatness of style, that made it be looked on as the best written book in the English language.

GAVEL, or GABLE, among builders. See GABLE. GAVEL, in law: tribute, toll, custom, or yearly revenue; of which we had in old time several kinds. See GABEL.

GAVEL-Kind, a tenure or custom belonging to lands in the county of Kent. The word is said by Lambard to be compounded of three Saxon words, *gafe, eal, kyn*, "omnibus cognatione proximis data." Verilegan calls it *gavelkind*, quasi "give all kind," that is, to each child his part: and Taylor, in his history of *gavelkind*, derives it from the British *gavel*, i. e. a hold or tenure, and *cenned*, "generatio aut familia;" and so *gavel cenned* might signify *tenura generationis*.—It is universally known what struggles the Kentish men made to preserve their ancient liberties, and with how much success those struggles were attended. And as it is principally here that we meet with the custom of *gavelkind*, (though it was and is to be found in some other parts of the kingdom), we may fairly conclude, that this was a part of these liberties; agreeably to Mr Selden's opinion, that *gavelkind*, before the Norman conquest, was the general custom of the realm. The distinguishing properties of this tenure are various: some of the principal are these. 1. The tenant is of age sufficient to alienate his estate by feoffment, at the age of 15. 2. The estate does not escheat in case of an attainer and execution for felony; their maxim being, "the father to the bough, the son to the plough." 3. In most places he had a power of devising lands by will, before the statute for that purpose was made. 4. The lands descend, not to the eldest, youngest, or any one son only, but to all the sons together; which was indeed anciently the most usual course of descent all over England, tho' in particular places particular customs prevailed.

GAVLET; in law, an ancient and special cessavit used in Kent, where the custom of *gavelkind* continues, by which the tenant, if he withdraws his rent and services due to the lord, forfeits his lands and tenements.

The process of the *gavlet* is thus. The lord is first to seek by the steward of his court, from three weeks to three weeks, to find some distress upon the tenement, till the fourth court; and if at that time he find none, at this fourth court it is awarded, that he take the tenement in his hand in name of a distress, and keep it a year and a day without manuring; within which time, if the tenant pay his arrears, and make reasonable amends for the with-holding, he shall have and enjoy his tenement as before: if he come not before the year and day be past, the lord is to go to the next county-court, with witnesses of what had passed at his own court, and pronounce there his process, to have

Gavel,
Gavelkind.

Gavelet
||
Gaul.

have further witnesses; and then by the award of his own court, he shall enter and manure the tenement as his own: so that if the tenant desired afterwards to have and hold it as before, he must agree with the lord; according to this old saying: "Has he not since any thing given, or any thing paid, then let him pay five pound for his hire, e're he become heilder again." Other copies have the first part with some variation; "Let him nine times pay, and nine times repay."

GAVELET, in London, is a writ used in the hustings, given to lords of rents in the city of London. Here the parties, tenant and demandant, appear by *fire facias*, to shew cause why the one should not have his tenement again on payment of his rent, or the other recover the lands on default thereof.

GAUGAMELA, (anc. geog.), a village of Attica, lying between the rivers Lycus and Tigris; famous for Alexander's victory over Darius. It is said to have been allowed to Darius Hyllaspes for the maintenance of a camel; and hence the name. It was not far from a more considerable place called *Arbela*; whence the latter gave the name to the victory. See **ARBELA**.

GAUGE-POINT of a solid measure, the diameter of a circle whose area is equal to the solid content of the same measure.

GAUGER, a king's officer, who is appointed to examine all tuns, pipes, hogheads, and barrels of wine, beer, ale, oil, honey, &c. and give them a mark of allowance, before they are sold in any place within the extent of his office.

GAUGING. See **GEOMETRY**.

GAUL, the name given by the Romans to the present kingdom of France.—The original inhabitants were descended from the Celtes or Gomerians, by whom the greatest part of Europe was peopled; the name of *Galli*, or *Gauls*, being probably given them long after their settlement in that country.

The ancient history of the Gauls is entirely wrapped up in obscurity and darkness; all we know concerning them for a long time is, that they multiplied so fast, that, their country being unable to contain them, they poured forth in vast multitudes into other countries, which they generally subdued, and settled themselves in. It often happened, however, that these colonies were so molested by their neighbours, that they were obliged to send for assistance to their native country. This was always very easily obtained. The Gauls were, upon every occasion, ready to send forth great numbers of new adventurers; and as these spread desolation where-ever they came, the very name of *Gauls* proved terrible to most of the neighbouring nations.—The earliest excursion of these people of which we have any distinct account, was into Italy, under a famed leader, named *Bellovesus*, about 622 years before Christ. He crossed the Rhone and the Alps, till then unattempted; defeated the Etrurians; and seized upon that part of their country, since known by the names of *Lombardy* and *Piedmont*.—The second grand expedition was made by the Cœnomani, a people dwelling between the rivers Seine and Loire, under a general named *Eltioin*. They settled in those parts of Italy, now known by the names of *Bresciano*, *Cremonesse*, *Mantuan*, *Carniola*, and *Venetian*.

—In a third excursion, two other Gaulish nations set-

tled on both sides of the river Po; and in a fourth, the Boii and Lingones settled in the country between Ravenna and Bologna. The time of these three last expeditions is uncertain.

The fifth expedition of the Gauls was more remarkable than any of the former, and happened about 200 years after that of *Bellovesus*. The Senones, settled between Paris and Meaux, were invited into Italy by an Etrurian lord, and settled themselves in Umbria. Brennus their king laid siege to Clusium, a city in alliance with Rome: and this produced a war with the Romans, in which the latter were at first defeated, and their city taken and burnt; but at length the whole army was cut off by Camillus, inasmuch that not a single person escaped.

Some other expeditions the Gauls undertook against the Romans: in which, though they always proved unsuccessful, by reason of their want of military discipline; yet their fierceness and courage made them so formidable to the republic, that, on the first news of their march, extraordinary levies of troops were made, sacrifices and public supplications offered to the gods, and the law which granted an immunity from military service to priests and old men, was, for the time, abolished.

Against the Greeks, the expeditions of the Gauls were very little more successful than against the Romans. The first of these we hear of, was about 279 years before Christ, in the year after Pyrrhus had invaded Italy. At this time, the Gauls finding themselves greatly overlooked at home, sent out three great colonies to conquer new countries for themselves. One of these armies was commanded by *Brennus*, another by *Cerethrius*, and the third by *Belgicus*. The first entered Pannonia or Hungary; the second Thrace; and the third marched into Illyricum and Macedonia. Here *Belgicus* at first met with great success; and enriched himself by plunder to such a degree, that *Brennus* envying him, resolved to enter the same countries, in order to share the spoil. In a short time, however, *Belgicus* met with such a total defeat, that his army was almost entirely destroyed; upon which *Brennus* halted to the same place. His army at first consisted of 150,000 foot and 15,000 horse: but two of his principal officers revolted, and carried off 20,000 men, with whom they marched into Thrace; where, having joined *Cerethrius*, they seized on Byzantium and the western coast of Propontis, making the adjacent parts tributary to them.—To retrieve this loss, *Brennus* sent for fresh supplies from Gaul; and having increased his army to 150,000 foot, and upwards of 60,000 horse, he entered Macedonia, defeated the general who opposed him, and ravaged the whole country. He next marched towards the straits of Thermopylæ, with a design to invade Greece; but was stopped by the forces sent to defend that pass against him. He passed the mountains, however, as Xerxes had formerly done; upon which the guards retired, to avoid being surrounded. *Brennus* then, having ordered *Acichærius*, the next to him in command, to follow at a distance with part of his army, marched with the bulk of the forces to Delphi, in order to plunder the rich temple there. This enterprise proved exceedingly unfortunate: a great number of his men were destroyed by a dreadful storm of hail, thunder, and lightning; another

Account of
the Gaulish
excursions
into Italy.

Expedition
against the
Greeks.

Miserable
fate of their
army.

Gaul.

Gaul.

another part of his army was destroyed by an earthquake; and the remainder, some how or other, imagining themselves attacked by the enemy, fought against each other the whole night, so that in the morning scarce one half of them remained. The Greek forces then poured in upon them from all parts; and that in such numbers, that though Acichorius came up in due time with his forces, Brennus found himself unable to make head against the Greeks, and was defeated, with great slaughter. He himself was desperately wounded; and so disheartened by his misfortune, that, having assembled all his chiefs, he advised them to kill all the wounded and disabled, and to make the best retreat they could; after which, he put an end to his own life. On this occasion, it is said that 20,000 of these unhappy people were executed by their own countrymen. Acichorius then set out with the remainder for Gaul; but by being obliged to march through the country of their enemies, the calamities they met with by the way were so grievous, that not one of them reached their own country. A just judgement, say the Greek and Roman authors, for their sacrilegious intentions against Delphi.

The Romans having often felt the effects of the Gaulish ferocity and courage, thought proper at last, in order to humble them, to invade their country. Their first successful attempt was about 118 years before Christ, under the command of Quintus Marcius, surnamed Rex. He opened a way betwixt the Alps and the Pyrenees, which laid the foundation for conquering the whole country. This was a work of immense labour of itself, and rendered still more difficult by the opposition of the Gauls, especially those called the Steni, who lived at the foot of the Alps. These people finding themselves overpowered by the consular army, set fire to their houses, killed their wives and children, and then threw themselves into the flames. After this Marcius built the city of Narbonne, which became the capital of a province. His successor Scaurus also conquered some Gaulish nations; and in order to facilitate the sending troops from Italy into that country, he made several excellent roads between them, which before were almost impassable. These successes gave rise to the invasion of the Cimbri and Teutones; an account of whose unfortunate expedition is given under the articles CIMBRI, ROME, TEUTONES, &c.

From this time, the Gauls ceased to be formidable to the Romans, and even seem to have been for some time on good terms with them. At last, however, the Helvetii kindled a war with the republic, which brought Cæsar over the Alps, and ended in the total subjection of the country. Orgetorix was the first cause of it; who had engaged a vast number of his countrymen to burn their towns and villages, and to go in search of new conquests. Julius Cæsar, to whose lot the whole country of Gaul had fallen, made such haste to come and suppress them, that he was got to the Rhone in eight days; broke down the bridge of Geneva, and, in a few days more, finished the famed wall between that city and mount Jura, now St Claude, which extended seventeen miles in length, was sixteen feet high, fortified with towers and castles at proper distances, and a ditch that ran the whole length of it. If his own account of it may be relied upon, he

did not set out till the beginning of April; and yet this huge work was finished by the ides or 13th of the month: so that, subtracting the eight days he was coming, it must have been all done in about five days: a prodigious work, considering he had but one legion there, or even though the whole country had given him assistance. Whilst this was doing, and the reinforcements he wanted were coming, he amused the Helvetii, who had sent to demand a passage through the country of the Allobroges, till he had got his reinforcements; and then flatly refused it to them: whereupon a dreadful battle ensued; in which they lost one hundred and thirty thousand men, in spite of all their valour; besides a number of prisoners, among whom was the wife and daughter of Orgetorix, the leader of this unfortunate expedition. The rest submitted, and begged they might be permitted to go and settle among the Ædui, from whom they originally sprung; and, at the request of these last, were permitted to go.

The Gauls were constantly in a state of variance with one another; and Cæsar, who knew how to make the most of these intestine broils, soon became the protector of the oppressed, a terror to the oppressor, and the umpire of all their contentions. Among those who applied to him for help, were his allies the Ædui; against whom Ariovistus, king of the Germans, joined with the Arverni, who inhabited the banks of the Loire, had taken the country of the Sequani from them, and obliged them to send hostages to him. Cæsar forthwith sent to demand the restitution of both, and, in an interview which he soon after obtained of that haughty and treacherous prince, was like to have fallen a sacrifice to his perfidy; upon which he bent his whole power against him, forced him out of his strong intrenchments, and gave him a total overthrow. Ariovistus escaped, with difficulty, over the Rhine; but his two wives, and a daughter, with a great number of Germans of distinction, fell into the conqueror's hand. Cæsar, after this signal victory, put his army into winter-quarters, whilst he went over the Alps to make the necessary preparations for the next campaign. By this time all the Belgæ in general were so terrified at his success, that they entered into a confederacy against the Romans, as their common enemy. Of this, Labienus, who had been left in Gaul, sent Cæsar notice; upon which, he immediately left Rome, and made such dispatch, that he arrived upon their confines in about fifteen days. On his arrival, the Rhemi submitted to him; but the rest, appointing Galba, king of the Sueffones, general of all their forces, which amounted to one hundred and fifty thousand men, marched directly against him. Cæsar, who had seized on the bridge of the Axona, now Aisne, led his light horse and infantry over it; and, whilst the others were incumbered in crossing that river, made such a terrible slaughter of them, that the river was filled with their dead, inasmuch that their bodies served for a bridge to those who escaped. This new victory struck such terror into the rest, that they dispersed themselves; immediately after which, the Sueffones, Belovaci, Ambiones, and some others, submitted to him. The Nervii, indeed, joined with the Atrebatas and Veromandui, against them; and, having first secured

6
A general confederacy against him.

7
The Gauls defeated with great slaughter.

some

4
Gaul invaded by the Romans.

5
Surprising success of Julius Cæsar.

Gaul.

their wives and children, made a vigorous resistance for some time; but were at length defeated, and the greatest part of them slain. The rest, with their wives and old men, surrendered themselves, and were allowed to live in their own cities and towns as formerly. The Aduatici were next subdued; and, for their treachery to the conquerors, were sold for slaves, to the number of fifty thousand. Young Crassus, the son of the triumvir, subdued likewise seven other nations, and took possession of their cities; which not only completed the conquest of the Belgæ, but brought several nations from beyond the Rhine to submit to the conqueror. The Veneti, or ancient inhabitants of Vannes in Brittany, who had been likewise obliged to send hostages to the conqueror, were, in the mean time, making great preparations, by sea and land, to recover their liberty. Cæsar, then in Illyricum, was forced to equip a fleet on the Loire; and, having given the command of it to Brutus, went and defeated them by land, as Brutus did by sea; and, having put their chief men to death, sold the rest for slaves. The Unelli, with Veridoric their chief, together with the Lexovii and Aulerci, were, about the same time, subdued by Sabinus, and the Aquitani by Crassus, with the loss of thirty thousand men. There remained nothing but the countries of the Morini and Menapii to be conquered, of all Gaul. Cæsar marched himself against them: but he found them so well intrenched in their inaccessible fortresses, that he contented himself with burning and ravaging their country; and, having put his troops into winter-quarters, again passed over the Alps, to have a more watchful eye on some of his rivals there. He was, however, soon after obliged to come to defend his Gaulish conquests against some nations of the Germans, who were coming to settle there, to the number of four hundred thousand. These he totally defeated, and then resolved to carry his conquering arms into Germany: but for an account of his exploits there, see the article GERMANY.

Upon his return into Gaul, he found it labouring under a great famine, which had caused a kind of universal revolt. Cotta and Sabinus, who were left in the country of the Eburones, now Liège, were betrayed into an ambush by Ambiorix, one of the Gaulish chiefs, and had most of their men cut off. The Aduatici had fallen upon Q. Cicero, who was left there with one legion, and had reduced him to great straits: at the same time Labienus, with his legion, was attacked by Indutiomarus, at the head of the Rhæni and Senones; but had better luck than the rest, and, by one bold sally upon them, put them to flight, and killed their general. Cæsar acquired no small credit by quelling all these revolts; but each victory lost the lives of so many of his troops, that he was forced to have recourse to Pompey for a fresh supply, who readily granted him two of his own legions to secure his Gaulish conquests.

But it was not long before the Gauls, ever restless under a foreign yoke, raised up a new revolt, and obliged him to return thither. His fear lest Pompey should gain the affections of the Roman people, had obliged him to strip the Gauls of their gold and silver, to bribe them over to his interest; and this gave no small handle to those frequent revolts which happened during his absence. He quickly, however, reduced

the Nervii, Adnatici, Menapii, and Treviri; the last of whom had raised the revolt, under the command of Ambiorix: but he found the flame spread much farther, even to the greatest part of the Gauls, who had chosen Vercingetorix their generalissimo. Cæsar was forced to leave Insurbria, whither he had retired to watch the motions of Pompey, and, in the midst of winter and snow, to repass the Alps, into the province of Narbonne. Here he gathered his scattered troops with all possible speed; and, in spite of the hard weather, besieged and took Noviodunum, now Noyons; and defeated Vercingetorix, who was come to the relief of that place. He next took the city of Avaricum, now Bourges, one of the strongest in Gaul, and which had a garrison of forty thousand men; of whom he made such a dreadful slaughter, that hardly eight hundred escaped. Whilst he was besieging Gergovia, the capital of the Arverni, he was informed that the Nitiobriges, or Agenois, were in arms; and that the Ædui were sending to Vercingetorix ten thousand men, which they were to have sent to reinforce Cæsar. Upon this news, he left Fabius to carry on the siege, and marched against the Ædui. There, upon his approach, submitted, in appearance, and were pardoned; but soon after that whole nation rose up in arms, and murdered all the Italian troops in their capital. Cæsar, at this, was in great straits what measures to take; but resolved at length to raise the siege of Gergovia, and at once attack the enemy's camp, which he did with some success: but when he thought to have gone to Noviodunum, or Noyons, where his baggage, military chest, &c. were left, he heard that the Ædui had carried it off, and burnt the place. Labienus, jolly thinking that Cæsar would want his assistance in the condition he now was, went to join him, and in his way defeated a Gaulish general, named Camlogenus, who came to oppose his march: but this did not hinder the revolt from spreading itself all over Celtic Gaul, whither Vercingetorix had sent for fresh supplies, and, in the mean time, attacked Cæsar; but was defeated, and forced to retire to Alesia, a strong place, now Aisne in Burgundy, as is supposed. Hither Cæsar hastened, and besieged him; and, having drawn a double circumvallation, with a design to starve him in it, as he was likely to have done, upon that account refused all offers of a surrender from him. At length, the long-expected reinforcement came, consisting of one hundred and sixty thousand men, under four generals: these made several fruitless attacks on Cæsar's trenches; but were defeated in three several battles, which at length obliged Vercingetorix to surrender at discretion. Cæsar used all his prisoners with great severity, except the Ædui and Arverni, by whose means he hoped to gain their nations, which were the most potent of Celtic Gaul: nor was he disappointed; for both of them submitted to him, and the former received him into their capital, where he spent the winter, after he had put his army into winter-quarters. This campaign, as it proved one of the hardest he ever had, so he gained more glory by it than any Roman general had done before: yet could not all by this procure from the servile senate, now wholly dedicated to his rival, a prolongation of his proconsulship; upon which he is reported to have laid his hand upon his sword, and said, that that should do it.

Gaul.

⁸
The Gauls
revolt, but
are sub-
dued.

⁹
A second
revolt.

¹⁰
They are
again sub-
dued.

Gaul.

He was good as his word; and the Gauls, upon their former ill success, resolving to have as many separate armies as provinces, in order to embarrass him the more, Cæsar, and his generals Labienus and Fabius, were forced to fight them one after another; which they did, however, with such success, that, notwithstanding the hardness of the season, they subdued the Bituriges, Carnuti, Rhemi, and Bellovaci, with their general Corbous, by which he at once quieted all the Belgic provinces bordering on Celtic Gaul. The next who followed were the Treviri, the Eburones, and the Andes, under their general Dunmarus. The last place which held out against him was Uxelodunum; which was defended by the two last acting generals of the Gauls, Drapes the Senonian, and Luterius the Cadurcean. The place being strong, and well garrisoned, Cæsar was obliged to march thither, from the farthest part of Belgic Gaul; and soon after reduced it, for want of water. Here again he caused the right-hands of all that were fit to bear arms to be cut off, to deter the rest from revolting afresh. Thus was the conquest of Gaul finished from the Alps and Pyrenees to the Rhine, all which vast tract was now reduced to a Roman province under the government of a prætor. During his several expeditions into Gaul, Cæsar is said to have taken 800 cities; to have subdued 300 different nations; and to have defeated, in several battles, three millions of men, of whom one million were killed, and another taken prisoner.—The history of the country, from the time of its conquest by the Romans to the present, is given under the articles **ROME** and **FRANCE**.

31
Gaul re-
duced to
a Roman
province.

32
Character,
&c. of the
ancient
Gauls.

The Gauls anciently were divided into a great number of different nations, which were continually at war with one another, and at variance among themselves. Cæsar tells us, that not only all their cities, cantons, and districts, but even almost all families, were divided and torn by factions; and thus undoubtedly facilitated the conquest of the whole. The general character of all these people was an excessive ferocity and love of liberty. This last they carried to such an extreme, that either on the appearance of servitude, or incapacity of action through old age, wounds, or chronic diseases, they put an end to their own lives, or prevailed upon their friends to kill them. In cities, when they found themselves so strictly besieged that they could hold out no longer, instead of thinking how to obtain honourable terms of capitulation, their chief care very often was to put their wives and children to death, and then to kill one another, to avoid being led into slavery. This excessive love of liberty and contempt of death, according to Strabo, very much facilitated their conquest by Cæsar; for putting their numerous forces upon such an experienced enemy as Cæsar, their want of conduct very soon proved the ruin of the whole.

The chief diversion of the Gauls was hunting; and indeed, considering the vast forests with which their country abounded, and the multitude of wild beasts which lodged in them, they were under an absolute necessity to hunt and destroy them, to prevent the country from being rendered totally uninhabitable. Besides this, however, they had also their hippodromes, horse and chariot races, tilts and tournaments; at all of which the bards assisted with their poems, songs,

and musical instruments.—For an account of their religion, see the article **DRUID**.

The Gauls were excessively fond of feasting, in which they were very profuse; as, like all other northern nations, they were great lovers of good eating and drinking. Their chief liquors were beer and wine. Their tables were very low. They eat but little bread, which was baked flat and hard, and easily broken in pieces: but devoured a great deal of flesh, boiled, roasted, or broiled; and this they did in a very slovenly manner, holding the piece in their hands, and tearing it with their teeth. What they could not part by this way, they cut with a little knife which hung at their girdle. When the company was numerous, the *Coryphæe*, or chief of the feast, who was either one of the richest, or noblest, or bravest, sat in the middle, with the master of the house by his side; the rest took their places next according to their rank, having their servants holding their shields behind them. These feasts seldom ended without bloodshed; but if by chance the feast proved a peaceable one, it was generally accompanied not only with music and songs, but likewise with dances, in which the dancers were armed cap-a-pee, and beat time with their swords upon their shields. On certain festivals they were wont to dress themselves in the skins of beasts, and in that attire accompany the processions in honour of their deities or heroes. Others dressed themselves in masquerade habits, some of them very indecent, and played several antic and inmodest tricks. This last custom continued long after their conversion to Christianity.

GAUNT-BELLIED, in the manege, is said of a horse whose belly shrinks up towards his flanks.

GAUNTLOPE, pronounced *gauntlet*, a military punishment for felony, or some other heinous offence.

In vessels of war, it is executed in the following manner. The whole ship's crew is disposed in two rows, standing face to face, on both sides of the deck, so as to form a lane whereby to go *forward* on one side, and return *ast* on the other; each person being furnished with a small twisted cord, called a *knittle*, having two or three knots upon it. The delinquent is then stripped naked above the waist, and ordered to pass forward between the two rows of men, and ast on the other side, a certain number of times, rarely exceeding three; during which every person gives him a stripe as he runs along. In his passage through this painful ordeal, he is sometimes tripped up, and very severely handled while incapable of proceeding. This punishment, which is called *running the gauntlet*, is seldom inflicted, except for such crimes as will naturally excite a general antipathy among the seamen; as, on some occasions, the culprit would pass without receiving a single blow, particularly in cases of mutiny and sedition, to the punishment of which our sailors seem to have a constitutional aversion.

In the land-service, when a soldier is sentenced to run the gauntlet, the regiment is drawn out in two ranks facing each other; each soldier, having a switch in his hand, lashes the criminal as he runs along naked from the waist upwards. While he runs, the drums beat at each end of the ranks. Sometimes he runs three, five, or seven times, according to the nature of the offence. The major is on horseback, and takes care that each soldier does his duty.

Gaul
||
Gauntlope.

Gavotta
|
Gay.

GAVOTTA, or **GAVOTTE**, is a kind of dance, the air of which has two brisk and lively strains in common time, each of which strains is twice played over. The first has usually four or eight bars; and the second contains eight, twelve, or more. The first begins with a minim, or two crotchets, or notes of equal value, and the hand rising; and ends with the fall of the hand upon the dominant or mediant of the mode, but never upon the final, unless it be a rondeau: and the last begins with the rise of the hand, and ends with the fall upon the final of the mode.

Tempi di GAVOTTA, is when only the time or movement of a gavotte is imitated, without any regard to the measure, or number of bars or strains.—Little airs are often found in sonatas, which have this phrase to regulate their motions.

GAUZE, or **GAUSE**, in commerce, a very slight, thin, open kind of stuff, made of silk, sometimes of thread. There are also figured gauzes, and some with gold or silver on silk ground.

GAY (John), a celebrated English poet, descended from an ancient family in Devonshire, was born at Exeter, and received his education at the free school of Barnstaple in that county, under the care of Mr. William Rayner.—He was bred a mercer in the Strand; but having a small fortune, independent of business, and considering the attendance on a shop as a degradation of those talents which he found himself possessed of, he quitted that occupation, and applied himself to other views, and to the indulgence of his inclination for the muses. In 1712 we find him secretary, or rather domestic steward, to the duchess of Monmouth, in which station he continued till the beginning of the year 1714; at which time he accompanied the earl of Clarendon to Hanover, whither that nobleman was dispatched by queen Anne. In the latter end of the same year, in consequence of the queen's death, he returned to England, where he lived in the highest estimation and intimacy of friendship with many persons of the first distinction both in rank and abilities.—He was even particularly taken notice of by queen Caroline, then princess of Wales, to whom he had the honour of reading in manuscript his tragedy of the *Captives*; and in 1726 dedicated his *Fables*, by permission, to the duke of Cumberland.—From this countenance shewn to him, and numberless promises made him of preferment, it was reasonable to suppose, that he would have been genteelly provided for in some office suitable to his inclination and abilities. Instead of which, in 1727, he was offered the place of gentleman-usher to one of the youngest princesses; an office which, as he looked on it as rather an indignity to a man whose talents might have been so much better employed, he thought proper to refuse; and some pretty warm remonstrances were made on the occasion by his sincere friends and zealous patrons the duke and duchess of Queensberry, which terminated in those two noble personages withdrawing from court in disgust. Mr Gay's dependencies on the promises of the great, and the disappointments he met with, he has figuratively described in his fable of the *Hare with many friends*. However, the very extraordinary success he met with from public encouragement made an ample amends, both with respect to satisfaction and emolument, for those private

disappointments.—For, in the season of 1727-8, appeared his *Beggar's Opera*; the vast success of which was not only unprecedented, but almost incredible.—It had an uninterrupted run in London of sixty-three nights in the first season, and was renewed in the ensuing one with equal approbation. It spread into all the great towns of England; was played in many places to the thirtieth and fortieth time, and at Bath and Bristol fifty; made its progress into Wales, Scotland, and Ireland, in which last place it was acted for twenty-four successive nights; and last of all it was performed at Minorca. Nor was the fame of it confined to the reading and representation alone, for the card-table and drawing-room shared with the theatre and closet in this respect; the ladies carried about the favourite songs of it engraven upon their fan-mounts, and screens and other pieces of furniture were decorated with the same. In short, the fate of this piece was so striking, so apparent, and so perfectly adapted to the taste of all degrees of people, that it overthrew the Italian opera, that Dagon of the nobility and gentry, which had so long seduced them to idolatry, and which Dennis, by the labours and outcries of a whole life, and many other writers by the force of reason and reflection, had in vain endeavoured to drive from the throne of public taste. The profits of this piece was so very great, both to the author and Mr Rich the manager, that it gave rise to a quibble, which became frequent in the mouths of many, viz. *That it had made Rich gay, and Gay rich*; and it has been asserted, that the author's own advantages from it were not less than two thousand pounds. In consequence of this success, Mr Gay was induced to write a second part to it, which he entitled *Polly*. But the disgust subsisting between him and the Court, together with the misrepresentations made of him as having been the author of some disaffected libels and seditious pamphlets, occasioned a prohibition and suppression of it to be sent from the lord chamberlain, at the very time when every thing was in readiness for the rehearsal of it. A very considerable sum, however, accrued to him from the publication of it afterwards in quarto.—Mr Gay wrote several other pieces in the dramatic way, and many very valuable ones in verse. Among the latter, his *Trivia*, or the *Art of walking the streets of London*, though his first poetical attempt, is far from being the least considerable, and is what recommended him to the esteem and friendship of Mr Pope: but, as among his dramatic works his *Beggar's Opera* did at first, and perhaps ever will, stand as an unrivalled master-piece, so, among his poetical works, his *Fables* hold the same rank of estimation, the latter having been almost as universally read as the former was represented, and both equally admired. Mr Gay's disposition was sweet and affable, his temper generous, and his conversation agreeable and entertaining. But he had one foible, too frequently incident to men of great literary abilities, and which subjected him at times to inconveniences which otherwise he needed not to have experienced, viz. an excess of indolence, without any knowledge of economy. So that, though his emoluments were, at some periods of his life, very considerable, he was at others greatly straitened in his circumstances; nor could he prevail on himself to follow the advice of his friend dean Swift, whom we find

in many of his letters endeavouring to persuade him to the purchasing of an annuity, as a reserve for the exigencies that might attend on old age.—Mr Gay chose rather to throw himself on patronage, than secure to himself an independent competency by the means pointed out to him; so that, after having undergone many vicissitudes of fortune, and being for some time chiefly supported by the liberality of the duke and duchess of Queensberry, he died at their house in Burlington-gardens, in December 1732. He was interred in Westminster-abbey, and a monument erected to his memory, at the expense of his aforementioned noble benefactors, with an inscription expressive of their regards and his own deserts, and an epitaph in verse by Mr Pope.

GAZA (Theodore), a famous Greek in the 15th century, was born in 1398. His country being invaded by the Turks, he retired into Italy; where he at first supported himself by transcribing ancient authors, an employment the learned had frequent recourse to before the invention of printing. His uncommon parts and learning soon recommended him to public notice; and particularly to cardinal Bessarion, who procured him a benefice in Calabria. He was one of those to whom the revival of polite literature in Italy was principally owing. He translated from the Greek into Latin, Aristotle's History of Animals, Theophrastus on Plants, and Hippocrates's Aphorisms; and put into Greek, Scipio's Dream, and Cicero's Treatise on Old Age. He wrote several other works in Greek and Latin; and died at Rome, in 1475.

GAZA, (anc. geog.) a principal city, and one of the five tetrapoles of the Philistines. It was situated about 100 stadia from the Mediterranean, on an artificial mound, and strongly walled round. It was destroyed by Alexander the Great, and afterwards by Antiochus. In the time of the Maccabees it was a strong and flourishing city; but was destroyed a third time by Alexander Jannæus. At present it has a miserable appearance. The buildings are mean, both as to the form and matter. Some remains of its ancient grandeur appear in the handsome pillars of Parian marble which support some of the roofs; while others are disposed of here and there, in different parts of almost every beggarly cottage. On the top of the hill, at the north-east corner of the town, are the ruins of large arches sunk low into the earth, and other foundations of a stately building, from whence some of the bashaws have carried off marble pillars of an incredible size. The castle is a contemptible structure, and the port is ruined. E. Long. 34. 55. N. Lat. 31. 28.

GAZE-HOUND, or *Gast-hound*, one that makes more use of his sight than of his nose. Such dogs are much used in the north of England: they are fitter in an open champaign country, than in bushy and woody places. If at any time a well-taught gaze-hound takes a wrong way, he will return upon a signal and begin the chase afresh. He is also excellent at spying out the fastest of a herd; and having separated it from the rest, will never give over the pursuit till he has worried it to death.

GAZELLA, in zoology, a species of CAPRA.

GAZETTE, a newspaper, or printed account of

the transactions of all the countries in the known world, in a loose sheet or half-sheet. This name is with us confined to that paper of news published by authority. The word is derived from *gazetta*, a Venetian coin, which was the usual price of the first news-paper printed there, and which was afterwards given to the paper itself.

The first gazette in England was published at Oxford, the court being there, in a folio half-sheet, Nov. 7, 1665. On the removal of the court to London, the title was changed to the *London Gazette*. The Oxford gazette was published on Tuesdays, the London on Saturdays; and these have continued to be the days of publication ever since.

GAZNA, a city of Asia, once much celebrated, and the capital of a very extensive empire; but which is now either entirely ruined, or become of so little consideration, that it is not taken notice of in our books of geography.—This city was anciently an emporium and fortrefs of Sablestan, not far from the confines of India. During the vast and rapid conquests of the Arabs, all this country had been reduced under their subjection. On the decline of the power of the khalifs, however, the vast empire established by Mahomet and his successors was divided into a number of independent principalities, most of which were but of short duration. In the year of the Hegira 384, answering to the 994th of the Christian æra, the city of Gazna, with some part of the adjacent country, was governed by Mahmud Gazni; who became a great conqueror, and reduced under his subjection a considerable part of India, and most of Persia.

This empire continued in the family of Mahmud Gazni for upwards of 200 years. None of his successors, however, were possessed of his abilities; and therefore the extent of the empire, instead of increasing, was very considerably diminished soon after Mahmud's death. The Seljuks made themselves masters of Khorasan, and could not be driven out; the greatest part of the Persian dominions also fell off; and in the 547th year of the Hegira, the race of Gazni sultans were entirely set aside by one Gauri, who conquered Khofru Shah the reigning prince, and bestowed his dominions on his own nephew Gayathoddin Mohammed. These new sultans proved greater conquerors than the former, and extended their dominions farther than even Mahmud Gazni himself had done. They did not, however, long enjoy the sovereignty of Gazna; for in 1218, Jenghiz Khan, having conquered the greatest part of China and almost all Tartary, began to turn his arms westward; and set out against the sultan of Gazna at the head of 700,000 men.

To oppose this formidable army, Mohammed, the reigning sultan, could muster only 400,000 men; and, in the first battle, 160,000 of his troops are said to have perished. After this victory, Jenghiz Khan advanced; Mohammed not daring to risk a second battle, the loss of which would have been attended with the entire ruin of his kingdom. He therefore distributed his army among the strongest fortified towns he had in his dominions; all of which Jenghiz Khan took one after another. The rapid progress of his conquests, indeed, almost exceeds belief. In 1219 and 1220, he had reduced Zarnuk, Nur, Bokhara, Otrar, Saganak, Uzkant, Alhashi, Jund, Tonkat, Khojend, and.

and Samarcand.—Mohammed, in the mean time, fled first to Bokhara; but on the approach of Jenghiz Khan's army, quitted that place, and fled to Samarcand. When this last city was also in danger of being invested, the sultan did not think proper to trust himself in it more than in the other, though it was garrisoned by 110,000 of his bravest troops; and therefore fled through by-ways into the province of Ghilan in Persia, where he took refuge in a strong fortress called *Esfabad*. But being also found out in this retreat, he fled to an island in the Caspian sea called *Abifkun*; where he ended his days, leaving his empire, such as it was, to his son Jaloloddin.

The new sultan was a man of great bravery and experience in war; but nothing was able to stop the progress of the Moguls. In 1220 and 1221, they made themselves masters of all the kingdoms of Kazarum and Khorasan, committing every where such massacres as were never heard of before or since that time. In the mean time Jaloloddin assembled his forces with the utmost diligence, and defeated two detachments of the Mogul army. This happened while Jenghiz Khan was besieging Bamian; but answered little other purpose, than serving to bring upon that city the terrible destruction, of which an account is given under the article BAMIAN. Immediately after the reduction of that city, Jenghiz Khan marched towards Gazna; which was very strongly fortified, and where he expected to have found Jaloloddin. But he had left the place 15 days before; and, as Jenghiz Khan's army was much reduced, he might perhaps have stood his ground, had it not been for an accident. He had been lately joined by three Turkish commanders, each of whom had a body of 10,000 men under his command. After his victories over the Moguls, these officers demanded the greatest share of the spoils; which being refused, they separated themselves from the sultan. He used his utmost endeavours to make them hearken to reason; and sent several messengers and letters to them, representing the inevitable ruin which must attend their separation, as Jenghiz Khan was advancing against them with his whole army. At last they were persuaded to lay aside their animosities; but it was now too late; for Jenghiz Khan, being informed of what passed, detached 60,000 horse to prevent their joining the sultan's army; who finding himself deprived of this powerful aid, retired towards the river Indus. When he was arrived there, he stopped in a place where the stream was most rapid and the place confined, with a view both to prevent his soldiers from placing any hopes of safety in flight, and to hinder the whole Mogul army from attacking him at once. Ever since his departure from Gazna he had been tormented with a colic; yet, at a time when he suffered most, hearing that the enemy's vanguard was arrived at a place in the neighbourhood called *Herder*, he quitted his litter, and, mounting a horse, marched with some of his chosen soldiers in the night; surprised the Moguls in their camp; and having cut them almost all in pieces, without the loss of a single man on his side, returned with a considerable booty.

Jenghiz Khan, finding by this that he had a vigilant enemy to deal with, proceeded with great circumspection. When he came near the Indus, he drew out

his army in battalia: to Jagatay, one of his sons, he gave the command of the right wing; to Oktay, another son, he gave the command of the left; and put himself in the centre, with 6000 of his guards. On the other side, Jaloloddin prepared for battle like one who had no resource but in victory. He first sent the boats on the Indus farther off; reserving only one to carry over his mother, wife, and children; but unluckily the boat split when they were going to embark, so that they were forced to remain in the camp. The sultan took to himself the command of the main body of the army. His left wing, drawn up under shelter of a mountain which hindered the whole right wing of the Moguls from engaging at once, was commanded by his vizir; and his right by a lord named *Amin Malek*. This lord began the fight; and forced the enemy's left wing, notwithstanding the great disparity of numbers, to give ground. The right wing of the Moguls likewise wanting room to extend itself, the sultan made use of his left as a body of reserve, detaching from thence some squadrons to the assistance of the troops who stood in need of them. He also took one part of them with him when he went at the head of his main body to charge that of Jenghiz Khan; which he did with so much resolution and vigour, that he not only put it in disorder, but penetrated into the place where Jenghiz Khan had originally taken his station; but that prince, having had a horse killed under him, was retired from thence, to give orders for all the troops to engage.

This disadvantage had like to have lost the Moguls the battle; for a report being immediately spread that the enemy had broken through the main body, the troops were so much discouraged, that they would certainly have fled, had not Jenghiz Khan encouraged them by riding from place to place in order to shew himself. At last, however, Jaloloddin's men, who were in all but 30,000, having fought a whole day with ten times their number, were seized with fear, and fled. One part of them retired to the rocks which were on the shore of Indus, where the enemy's horse could not follow them; others threw themselves into the river, where many were drowned, though some had the good fortune to cross over in safety; while the rest, surrounding their prince, continued the fight through despair. The sultan, however, considering that he had scarce 7000 men left, began to think of providing for his own safety: therefore, having bidden a final adieu to his mother, wife and children, he mounted a fresh horse, and spurred him into the river, which he crossed in safety, and even stopped in the middle of it to insult Jenghiz Khan, who was now arrived at the bank. His family fell into the hands of the Moguls; who killed all the males, and carried the women into captivity.

Jaloloddin being now securely landed in India, got up into a tree, in order to preserve himself from wild beasts. Next day, as he walked melancholy among the rocks, he perceived a troop of his soldiers, with some officers, three of whom proved to be his particular friends. These, at the beginning of the defeat, had found a boat in which they had sailed all night, with much danger from the rocks, shelves, and rapid current of the river. Soon after, he saw 300 horse coming towards him; who informed him of 4000 more that

Gazna
||
Gelatina.

that had escaped by swimming over the river; and these also soon after joined the rest. In the mean time an officer of his household, named Jamalarrad, knowing that his master and many of his people were escaped, ventured to load a very large boat with arms, provisions, money, and stuff to clothe the soldiers; with which he crossed the river. For this important service Jaloloddin made him steward of his household, and furnished him the *Chyfen* or the *Glory of the faith*. For some time after, the sultan's affairs seemed to go on prosperously: he gained some battles in India; but the princes of that country, envying his prosperity, conspired against him, and obliged him to repass the Indus. Here he again attempted to make head against the Moguls; but was at last defeated and killed by them, and a final end put to the once mighty empire of Gazna.

The metropolis was reduced by Oktay; who no sooner entered the country in which it was situated, than he committed the most horrid cruelties. The city was well provided with all things necessary for sustaining a siege; had a strong garrison, and a brave and resolute governor. The inhabitants, expecting no mercy from Jenghiz Khan, who they knew had sworn their ruin, were resolved to make a desperate defence. They made frequent sallies on the besiegers, several times overthrew their works, and broke above 100 of their battering rams. But one night, after an oblique fight, part of the city-walls fell down; and a great number of Moguls having filled up the ditch, entered the city sword-in-hand. The governor perceiving all was lost, at the head of his bravest soldiers rushed into the thickest of his enemies, where he and his followers were all slain. However, Gazna was not entirely destroyed, nor were the people all killed; for after the massacre had continued four or five hours, Oktay ordered it to cease, and taxed those who were left alive at a certain rate, in order to redeem themselves and the city. It doth not, however, appear that after this time the city of Gazna ever made any considerable figure.—It was taken by the Moguls in the year 1222.

GECCO, in natural history, a name given by the Indians to their terrible poison, which kills when mixed with the blood in ever such a small quantity. They say that this gecco is a venomous frog or humour vomited out of the mouths of their most poisonous serpents; which they procure in this fatal strength, by hanging up the creatures by the tails, and whipping them to enrage them: they collect this in proper vessels as it falls; and when they would use it, they either poison a weapon with it, or wounding any part of the flesh introduce the smallest quantity imaginable into it; and this is said to be immediate death.

GECKO. See LACERTA.

GEDDES (James), born of a respectable family in Scotland in 1710, was educated for and practised at the bar several years; but died of a consumption before he arrived at the age of 40. He published *An essay on the composition and manner of writing of the ancients*; and left behind him several other tracts.

GELATINA, JELLY, a form of food, or medicine, prepared from the juices of ripe fruits, boiled to proper consistence with sugar, or of the strong decoctions of the horns, bones, or extremities of animals boiled to such a degree as to be stiff and firm when cold,

without the addition of sugar.

The jellies of fruits are cooling, saponaceous, and aecetic; and therefore are good as medicines in all disorders of the primæ viæ arising from alkalescent juices, especially when not given alone, but diluted with water. On the contrary, the jellies made from animal-substances are all alkalescent, and are therefore good in all cases where an acidity of the humours prevails: the alkalescent quality of these, however, is in a great measure taken off by adding lemon-juice and sugar to them. There were formerly a kind of jellies much in use, called *compound jellies*; these had the restorative medicinal drugs added to them, but they are now scarce ever heard off.

GELATINA *Avenæ*, Oat-jelly; a jelly of common oats, recommended by many of the German physicians in all hectic disorders, to be taken with broth of snails and craw-fish.—It is made by boiling a large quantity of oats, freed from the husk, with some hartshorn shavings and currants, together with a leg of veal cut in pieces, and with the bones all broken: these are to be set over the fire with a large quantity of water, till the whole is reduced to a kind of jelly; which when strained and cold will be very firm and hard. A few spoonfuls of this are to be taken every morning, diluted with a basin of either of the above-mentioned broths, or any other warm liquor.

GELD, in the English old customs, a Saxon word signifying *money*, or *tribute*. It also denoted a compensation for some crime committed: Hence *wergeld*, in their ancient laws, was used for the value of a man slain; and *or-geld*, of a beast.

GELDENHAUR (Gerard), in Latin *Geldenbarius*, an historian and Protestant divine in the 16th century. He was a native of Nimeguen, and studied classical learning at Deventer. He went through his course of philosophy at Louvaine, where he contracted a very strict friendship with several learned men, and particularly with Erasmus. He became reader and historian to Charles of Austria, and afterwards to Maximilian of Burgundy. At length he embraced the Protestant religion; taught history at Marburg; and afterwards divinity till his death, in 1542. He wrote, 1. History of Holland. 2. History of the Low Countries; 3. History of the bishops of Utrecht; and other works.

GELDERLAND. See GUELDERLAND.

GELDERS. See GUELDRÉS.

GELDING, the operation of castrating any animal, particularly horses.

The operation consists in cutting out the testicles; in performing which, three things are to be observed: first, regard is to be had to their age; next to the season of the year; and lastly to the state of the moon. For the first, if the operation is to be performed on a colt, he may be gelded at nine or fifteen days old, if the testicles be come down; in regard the sooner he is gelt the better it will be for his growth, shape, and courage; though a horse may be gelt at any age, if proper care is taken in the cure. As for the second, the best time is about April or May, or else about the latter end of September. And for the third, the wane of the moon is the most proper time for performing this operation.

The manner of gelding is as follows. The beast

Gelati
||
Geldin

being cast down on some soft place, the operator takes the stones between his foremost and his great finger, and flitting the cod presses the stones forth; then taking a pair of nippers made very smooth, either of steel, box, or brass-wood, he claps the strings of the stones between them, very near to where the stones are set on, and presses them so hard that there may be no flux of blood; then with a thin, drawing, cauterising iron, sears away the stone. This done, he takes a hard plaster made of rosin, wax, and washed turpentine, well dissolved together, and melts it on the head of the strings: he then sears them, and melts more of the salve, till such time as he has laid a good thickness of it upon the strings.

When this is done to one stone, the nippers are loosened, and the like is done to the other; and the two slits of the cod are then filled with white salt, and the outside of the cod is anointed with hog's grease: and thus they let him rise, and keep him in a warm stable, without tying him up. If he swells much in his cods or sheath, they chase him up and down, and make him trot for an hour in a day, which soon recovers him.

The manner of gelding a hog is as follows: The operator, after having made two cross slits or incisions on the middle of the stones, presses them out, and anoints the fore with tar. But another general method, yet somewhat more dangerous if not well done, is, first to cut the stone on the top, and after having drawn that one forth, the operator puts in his fingers at the same slit, and with a lancet cuts the skin between the two stones, and by that slit presses out the other stone. Then having cleaned out the blood, he anoints the part with fresh grease: and thus there is but one incision made in the cod. Boar-pigs ought to be gelded about six months old; yet they are commonly gelded about three weeks or a month old.

GELENHAUSEN, a small imperial town of Wetteravia in Germany, with a castle built by the emperor Frederic I. E. Long. 8. 13. N. Lat. 50. 20.

GELENIUS (Sigismund), a learned and excellent man, born of a good family at Prague, about the year 1498. Erasmus conceiving an esteem for him at Basil, recommended him to John Frobenius as a corrector for his printing-house; which laborious charge he accepted, and had a great number of Hebrew, Greek, and Latin books to correct: he also translated many works himself from the Greek into Latin; and published a dictionary in four languages, Greek, Latin, German, and Slavonian. Profitable and honourable employments were offered him in other places, but nothing could tempt him to quit his peaceful situation at Basil. He died in 1555. All his translations are highly esteemed.

GELLERT (Christian), one of the finest geniuses Germany has produced, was born at Hænichen, near Freyburg in Saxony in 1715; and studied at Leipzig, at which university he was for many years professor of philosophy and the belles lettres. He early distinguished himself by his talent for poetry; and contracted a strict friendship with the most learned and polite writers in Germany. All his works are filled with sentiment, and bear the impression of the sweetness of his disposition. The most considerable of them are his comedies, his spiritual songs and moral poems,

and particularly his sacred odes, his fables, and his tales. He died in 1769, much lamented.

GELLI (John Baptist), an eminent Italian writer, was born of mean parents at Florence, in the year 1498. He was bred a taylor: but had such an extraordinary genius, that he acquired several languages, and made an uncommon progress in the belles lettres; and though he continued always to work at his trade, became acquainted with all the wits and learned men at Florence, and his merit was universally known. He was chosen a member of the academy there, and the city made him a burges. He acquired the highest reputation by his works, which are, 1. *J. Capricci del Bottai*, quarto; which contains ten dialogues. 2. *La Circe*, octavo: This, which also contains ten dialogues, and treats of human nature, has been translated into Latin, French, and English. 3. *Differenziazioni* in Italian on the poems of Dante and Petrarch. 4. The comedies of *La Sporta* and *La Errore*; and other works. He died in 1563.

GELLIBRAND (Henry), a laborious astronomer of the last century, was born in 1597. Though he was not without good views in the church, yet he became so enamoured with mathematical studies, that on the death of his father he became a student at Oxford, contented himself with his private patrimony, and devoted himself solely to them. On the death of Mr Gunter, he was recommended by Mr Briggs to the trustees of Gresham college, for the astronomical professorship there; to which he was elected in 1627. His friend Mr Briggs dying in 1630, before he had finished his *Trigonometria Britannica*, it was finished by Gellibrand at his request. He wrote several other things, chiefly tending to the improvement of navigation; and died in 1636.

GELLIUS (Aulus), or (as he is sometimes called) *Agellius*; a celebrated grammarian, who lived in the 2d century under Marcus Aurelius and some succeeding emperors. He wrote a collection of observations on authors, for the use of his children; and called it *Noctes Atticae*, because composed in the evenings of a winter he spent at Athens. The chief value of it, is for preserving many facts and monuments of antiquity not to be found elsewhere. Critics and grammarians have bestowed much pains on this writer.

GELLY. See GELATINA.

GEM, in natural history, a common name for all precious stones; in which there are two classes, the pellucid and semipellucid.

The bodies composing the class of pellucid gems are bright, elegant, and beautiful fossils, naturally and essentially compound, ever found in small detached masses, extremely hard, pellucid, and of great lustre; composed of a very firm and pure matter, without any admixture of earthy substance; giving fire with steel, not fermenting with acid menstrua, and very difficultly calcinable in the fire. Of this class there are two genera; the chroastasma, and the chroastaces. See CHROASTASMA and CHROASTACES.

The bodies composing the class of semipellucid gems, are stones naturally and essentially compound, not inflammable nor soluble in water, found in detached masses, and composed of crystalline matter, defaced by earth: however, they are but slightly defaced, and are of great beauty and brightness, of a moderate de-

Gem. degree of transparency, and are usually found in small masses.

Of this class there are two orders: the first of which consists of the femipellucid gems, of but two variegations, and frequently of one plain simple colour; tho' sometimes veined: this order contains four genera, viz. the *larde*, the *chalcedonies*, the *hydropheas*, and the *pramnion*. See the articles *SARDÆ*, *CHALCEDONII*, *HYDROPHANÆ*, and *PRAMNION*.

The second order of femipellucid gems, consisting of those remarkable for their veins, zones, and variegations, contains also four genera, viz. the *achate*, the *onyx*, the *sardonyx*, and the *camea*. See the articles *ACHATÆ*, *ONYCHES*, *SARDONYCHES*, and *CAMÆA*.

The knowledge of gems depends principally on observing their hardness and colour. Their hardness is commonly allowed to stand in the following order: the diamond the hardest of all; then the ruby, sapphire, jacinth, emerald, amethyst, garnet, carnel, chalcedony, onyx, jasper, agate, porphyry, and marble. This difference, however, is not regular and constant, but frequently varies. Good crystals may be allowed to succeed the onyx; but the whole family of metallic glassy fluors seem to be still softer.—In point of colour, the diamond is valued for its transparency, the ruby for its purple, the sapphire for its blue, the emerald for its green, the jacinth for its orange, the amethyst carnel for its carnation, the onyx for its tawny, the jasper, agate, and porphyry for their vermilion, green, and variegated colours, and the garnet for its transparent blood-red.

All these gems are sometimes found coloured and spotted, and sometimes quite limpid and colourless. In this case the diamond-cutter or polisher knows how to distinguish their different species by their different degrees of hardness upon the mill. For the cutting or polishing of gems, the fine powder of the fragments of those that are next in degree of hardness is always required to grind away the softer; but as none of them are harder than the diamond, this can only be polished by its own powder.

Imitation or Counterfeiting of GEMS in Glass.—The art of imitating gems in glass, is too considerable to be passed without notice: some of the leading compositions therein, we shall briefly mention upon the authority of Neri.

These gems are made of pastes; and are noway inferior to the native stones, when carefully made and well polished, in brightness or transparency, but want their hardness.

The general rules to be observed in making the pastes are these: 1. That all the vessels in which they are made be firmly luted, and the lute left to dry before they are put into the fire. 2. That such vessels be chosen for the work, as will bear the fire well. 3. That the powders be prepared on a porphyry stone; not in a metal mortar, which would communicate a tinge to them. 4. That the just proportion in the quantity of the several ingredients be nicely observed. 5. That the materials be all well mixed; and, if not sufficiently baked the first time, to be committed to the fire again, without breaking the pot: for if this be not observed, they will be full of blisters and air-bubbles. 6. That a small vacuity be always left at the top

of the pot, to give room to the swelling of the ingredients.

To make paste of extreme hardness, and capable of all the colours of the gems, with great lustre and beauty.—Take of prepared crystal, ten pounds; salt of polverine, six pounds; sulphur of lead, two pounds; mix all these well together into a fine powder; make the whole with common water into a hard paste; and make this paste into small cakes of about three ounces weight each, with a hole made in their middle; dry them in the sun, and afterwards calcine them in the straitest part of a potter's furnace. After this, powder them, and levigate them to a perfect fineness on a porphyry-stone, and set this powder in pots in a glass-furnace to purify for three days: then cast the whole into water, and afterwards return it into the furnace, where let it stand 15 days, in which time all foulness and blisters will disappear, and the paste will greatly resemble the natural jewels. To give this the colour of the emerald, add to it brash thrice calcined; for a sea-green, brash simply calcined to a redness; for a sapphire, add zaffer, with manganese; and for a topaz, manganese and tartar. All the gems are thus imitated in this, by the same way of working as the making of coloured glasses; and this is so hard, that they very much approach the natural gems.

The colour of all the counterfeit gems made of the several pastes, may be made deeper or lighter, according to the work for which the stones are designed; and it is a necessary general rule, that small stones for rings, &c. require a deeper colour, and large ones a paler. Besides the colours made from manganese, verdigrease, and zaffer, which are the ingredients commonly used, there are other very fine ones which care and skill may prepare. Very fine red may be made from gold, and one not much inferior to that from iron; a very fine green from brash or copper; a sky-colour from silver, and a much finer one from the granates of Bohemia.

GEMARA, in Jewish antiquities, a collection of decisions and determinations on the law, written after the Misna was completed.

It was called *gema*, or *perfection*; because it was considered as so perfect an explication of the law, that after it no further additions could be made, or any thing more desired. It is otherwise called *the tal mud*. See *TALMUD*.

GEMINI, the *TWINS*, in astronomy, one of the 12 signs of the zodiac, the third in order, beginning with Aries. See *ASTRONOMY*, n° 206.

GEMINIANI, a celebrated musician and composer, was born at Lucca in the year 1680. He received his first instructions in music from Alessandro Scarlatti; and after that became a pupil of Carlo Ambrosio Lunati, surnamed *Il Gobbo*, a most celebrated performer on the violin; after which he became a disciple of Corelli, and under him finished his studies on that instrument. In the year 1714, he came to England; where in a short time he so recommended himself by his exquisite performance, that all who professed to love and understand music, were captivated with hearing him. Many of the nobility laid claim to the honour of being his patrons; but he seemed chiefly to attach himself to Baron Kilmansegg, chamberlain to king George I. as elector of Hanover, and a favourite

Geminiani. of that prince. In 1716, he published and dedicated to his patron 12 sonatas a *violino violone e cembalo*: the first six with fugues and double stops as they are vulgarly called; the last with airs of various measures, such as allemandes, courants, and jiggs. This publication was so well relished by his patron, that he mentioned Geminiani to the king as an excellent performer; in consequence of which our musician had the honour to perform before his majesty, in concert with the celebrated Handel who played on the harpsichord.

But though Geminiani was exceedingly admired, yet he had not a talent at associating music with poetry, nor do we find that he ever became a public performer: he was therefore obliged to depend for his subsistence on the friendship of his patrons, and the profits which accrued to him from teaching. He had also the misfortune to be an enthusiast in painting; and the volatility of his temper was such, that, in order to gratify this passion, he not only suspended his studies, and neglected to exercise his talents, but involved himself in debts. In 1727, he was offered the place of master and composer of the state-music in Ireland; but this could not be conferred on a Catholic, and Geminiani refused to change his religion: upon which it was given to Matthew Dubourg, a young man who had been one of his pupils, and was a celebrated performer on the violin. Geminiani then set himself to compose parts to the *opera quinta* of Corelli; or, in other words, to make concertos of the first six of his solos. This work he completed, and, with the help of a subscription, at the head of which were the names of the royal family, published in 1726. In 1732, he published his *opera seconda*, which contains a celebrated minuet that goes by his name. He published many other pieces, the profits of which did not much mend his circumstances; but this perhaps was owing to his rambling disposition and enthusiastic fondness of painting. He was also an utter stranger to the business of an orchestra, and had no idea of the labour and pains necessary in the instruction of fingers for the performance of music to which they were strangers. The consequence of this was, that a *concerto spirituale*, which he had advertised for his own benefit in 1748, failed in the performance. The audience, however, compassionate his distress, and sat very silent till the books were changed; when the performance was continued with compositions of the author's own, and which he executed in such a manner as was never forgot. The profits arising from this performance enabled him to take a journey to Paris; where he staid long enough to get plates engraven for a score of solos, and the parts of two operas of concertos. About the year 1755 he returned to England, and advertised them for sale.

In 1761, Geminiani went over to Ireland; and was kindly entertained there by Mr Matthew Dubourg, who had been his pupil, and was then master of the king's band in Ireland. This person through the course of his life had ever been disposed to render him friendly offices; and it was but a short time after Geminiani's arrival at Dublin, that he was called upon to do him the last. It seems that Geminiani had spent many years in compiling an elaborate treatise on music, which he intended for publication; but soon after his arrival at Dublin, by the treachery of a female fer-

vant, who, it was said, was recommended to him for no other end than that she might steal it, it was conveyed away, and could not be recovered. The greatness of this loss, and his inability to repair it, made a deep impression on his mind; and, as is conjectured, hastened his end; at least he survived it but a short time, ending his days on the 17th of September 1762. The following list comprises the whole of his publications, except two or three articles of small account. Twelve solos for a violin, *opera prima*; six concertos in seven parts, *opera seconda*; six concertos in seven parts, *opera terza*; twelve solos for a violin, *opera quarta*; six solos for a violoncello, *opera quinta*; the same made into solos for a violin; six concertos from his *opera quarta*; six concertos in eight parts, *opera settima*; rules for playing in taste; a treatise on good taste; the art of playing the violin; 12 sonatas from his first solos, *opera undecima*; Ripieno parts to ditto; lessons for the harpsichord; *Guida Armonica*; supplement to ditto; the art of accompaniment, two books; his first two operas of concertos in score; and the enchanted forest.—Of his solos the *opera prima* is esteemed the best. Of his concertos some are excellent, others of them scarce pass the bounds of mediocrity. The sixth of the third opera not only surpasses all the rest, but, in the opinion of the best judges of harmony, is the finest instrumental composition extant.

GEMMA, or BUD, in botany; a compendium or epitome of a plant seated upon the stem and branches, and covered with scales, in order to defend the tender rudiments inclosed from cold and other external injuries, till, their parts being unfolded, they acquire strength, and render any further protection unnecessary.

Buds, together with bulbs, which are a species of buds generally seated upon or near the root, constitute that part of the herb called by Linnæus *hybernacula*; that is, the winter-quarters of the future vegetable: a very proper appellation, as it is during that severe season that the tender rudiments are protected in the manner just mentioned.

Plants, considered in analogy to animals, may properly enough be reckoned both viviparous and oviparous. Seeds are the vegetable eggs; buds, living fetuses, or infant-plants, which renew the species as certainly as the seed.

Buds are placed at the extremity of the young shoots, and along the branches, being fixed by a short foot-stalk upon a kind of brackets, the remainder of the leaves, in the wings or angles of which the buds in question were formed the preceding year. They are sometimes placed single; sometimes two by two, and those either opposite or alternate; sometimes collected in greater numbers in whorls or rings.

With respect to their construction, buds are composed of several parts artificially arranged. Externally, we find a number of scales that are pretty hard, frequently armed with hairs, hollowed like a spoon, and placed over each other like tiles. These scales are fixed into the inner plates of the bark, of which they appear to be a prolongation. Their use is to defend the internal parts of the bud; which, being unfolded, will produce, some, flowers, leaves, and stipule; others, footstalks and scales. All these parts, while they remain in the bud, are tender, delicate, folded

Gemma,
or Bud.Gemma,
or Bud.

over each other, and covered with a thick clammy juice, which is sometimes refinous and odoriferous, as in the tacamahac-tree. This juice serves not only to defend the more tender parts of the embryo-plant from cold, the assaults of insects, and other external injuries; but likewise from excessive perspiration, which, in its young and infant state, would be very destructive. It is conspicuous in the buds of horse-chestnut, poplar and willow trees.

In general, we may distinguish three kinds of buds; that containing the flower, that containing the leaves, and that containing both flower and leaves.

The first, termed *gemma florifera*, and by the French *bouton a fleur* or *a fruit*, contains the rudiments of one or several flowers, folded over each other, and surrounded with scales. In several trees, this kind of bud is commonly found at the extremity of certain small branches, which are shorter, rougher, and less garnished with leaves, than the rest. The external scales of this species of bud are harder than the internal; both are furnished with hairs, and in general more swelled than those of the second sort. The bud containing the flower too is commonly thicker, shorter, almost square, less uniform, and less pointed; being generally terminated obtusely. It is called by Pliny *oculus gemmae*; and is employed in that species of grafting called *inoculation*, or *budding*.

The second species of bud, that, viz. containing the leaves, termed *gemma foliifera*, and by the French *bouton a feuilles* or *a bois*, contains the rudiments of several leaves, which are variously folded over each other, and outwardly surrounded by scales, from which the small stipulae that are seated at the foot of the young branches are chiefly produced. These buds are commonly more pointed than the former sort. In the hazel-nut, however, they are perfectly round; and in horse-chestnut, very thick.

The third sort of bud is smaller than either of the preceding; and produces both flowers and leaves, tho' not always in the same manner. Sometimes the flowers and leaves are unfolded at the same time. This mode of the flower and leaf bud, is termed by Linnaeus *gemma foliifera & florifera*. Sometimes the leaves proceed or emerge out of this kind of bud upon a small branch, which afterwards produces flowers. This mode of the flower and leaf bud is termed by Linnaeus *gemma foliifero-florifera*, and is the most common bud of any.

Such buds as produce branches adorned only with leaves, are called *barren*; such as contain both leaves and flowers, *fertile*. From the bulk of the bud we may often, with ease, foretell whether it contains leaves only, or leaves and flowers together, as in cherry and pear trees.

Neither the buds produced on or near the root, called by some authors *suriones*, nor those produced on the trunk, and from the angles or wings of the leaves, contain, in strict propriety, an entire delineation of the plant; since the roots are wanting; and in various buds, as we have seen, shoots are contained with leaves only, and not with flowers; but as a branch may be considered as a part similar to the whole plant, and, if planted, would, in process of revegetation, exhibit or produce roots and flowers, we may in general allow, that the bud contains the whole plant, or

the principles of the whole plant, which may be unfolded *ad libitum*; and thus resembles the seed, in containing a delineation of the future plant in embryo: for although the bud wants a radicle, or plumula, of which the seed is possessed, yet it would undoubtedly form one, if planted in the earth. But as the medullary part adhering to the bud is too tender, and by the abundance of juice flowing into it from the earth would be disposed to putrefaction, the buds are not planted in the soil, but generally inserted within the bark of another tree; yet placed so that the production of the marrow, or pith, adhering to them, may be inserted into the pith of the branch in which the fissure or cleft is made; by which means there is a large communication of juice. This propagation by gems or buds, called *inoculation*, is commonly practised with the first sort of buds above described.

From the obvious uses of the buds, we may collect the reason why the supreme Author of nature has granted this sort of protection to most of the trees that are natives of cold climates; and, on the other hand, denied it to such as, enjoying a warm benign atmosphere, have not the tender parts of their embryo-shoots exposed to injuries and depredations from the severities of the weather. Of this latter kind are the plants of the following list; some of them very large trees; others, smaller woody vegetables, of the shrub and under-shrub kind: Citron, orange, lemon, cassava, mock orange, blad-apple, shrubby swallow-wort, alaternus, shrubby geraniums, berry-bearing alder, Christ's-thorn, Syrian mallow, baobab or Ethiopian, soursour, Justicia, wild fena, the acacias and sensitive plant, coral-tree, stinking bean-trefoil, medicago, oleander, viburnum, sumach, ivy, tamarisk, heath, Barbadoes cherry, lavatera, rue, shrubby night-shades, Guinea-henweed, cypress, liguam-vitæ, and savine a species of juniper.

On annual plants, whose root as well as stalk perishes after a year, true buds are never produced; in their stead, however, are protruded small branches, like a little feather, from the wings of the leaves, which wither without any farther expansion, if the plants climb, and have no lateral branches; but if, either by their own nature, or from abundance of sap, the plants become branched, the ramuli just mentioned obtain an increase similar to that of the whole plant.

The same appearance obtains in the trees of warm countries, such as those enumerated in the above list, in which a plumula, or small feather, sends forth branches without a scaly covering; as, in such countries, this tender part requires no defence or protection from cold. A scaly covering then is peculiar to buds, as it protects the tender embryo enclosed from all external injuries. When we therefore speak of trees having buds that are naked or without scales, our meaning is the same as if we had said that they have no buds at all.

The buds that are to be unfolded the following year, break forth from the evolved buds of the present year, in such a manner as to put on the appearance of small eminences in the wings or angles of the leaves. These eminences or knots grow but little during the summer; as, in that season, the sap is expended on the increase of the parts of the plant; but in autumn, when the leaves begin to wither and fall off, the buds, placed

Gemmatio
||
Gendarmes

placed on the wings, increase; and the embryo-plant, contained in the bud is so expanded, that the leaves and flowers, the parts to be evolved the following year, are distinctly visible. Thus in horse-chestnut the leaves, and in cornel-tree the flowers, are each to be observed in their respective buds.

As each bud contains the rudiments of a plant, and would, if separated from its parent vegetable, become every way similar to it; Linnaeus, to shew the wonderful fertility of nature, has made a calculation, by which it appears, that in a trunk scarce exceeding a span in breadth, ten thousand buds (that is, herbs) may be produced. What an infinite number, then, of plants might be raised from a very large tree!

GEMMATIO, from *gemma* "a bud;" a term used by Linnaeus, expressive of the form of the buds, their origin, and their contents. It includes both those properly called *buds*, and those which are seated at the roots, styled *bulbs*.

As to the origin of buds, they are formed either of the footstalks of the leaves, of *stipule*, or of scales of the bark. Their contents have been already discovered, in the preceding article, to be either flowers, leaves, or both.

GENDARMES, or GENS D'ARMES, in the French armies, a denomination given to a select body of horse, on account of their succeeding the ancient Gendarmes, who were thus called from their being completely clothed in armour; (see *Scots GENDARMES, infra*.) These troops are commanded by captain-lieutenants, the king and the princes of the blood being their captains: the king's troop, besides a captain-lieutenant, has two sublieutenants, three ensigns, and three guidons.

Grand GENDARMES, at present are a troop composed of 250 gentlemen; the king himself is their captain, and one of the first peers their captain-lieutenant, who has under him two lieutenants, three ensigns, three guidons, and other officers.

Small GENDARMERY, are, the Scots Gendarmes, the queen's, the dauphin's, the gendarmes of Anjou, Burgundy, the English and Flemish gendarmes, having each a captain-lieutenant, sub-lieutenant, ensign, guidon, and quarter-master.

Scots GENDARMES were originally instituted by Charles VII. of France, about the middle of the 5th century, and formed a part of his guard; in which station also they acted under other princes. It was their prerogative to take precedence of all the companies of the gendarmery of France; and, on particular occasions, they even preceded the two companies of the king's mousquetaires. The sons of the Scottish monarchs were the usual captains of this company; and, after Mary's accession to the throne, its command belonged to them as a right. It was thence that James VI. made a claim of it for his son prince Henry. This honour, and its emoluments, were also enjoyed by Charles I. and the next in command to this prince was Louis Stuart duke of Lennox. George Gordon, marquis of Huntley, succeeded the duke of Lennox in the year 1624, and took the title of captain or commander in chief when Charles I. mounted the English throne. It is not certain whether Charles II. was ever captain of this company; but it was conferred on his brother the duke of York, who was captain

Genders
||
Genealogy.

of the Scots gendarmes till the year 1667, when he resigned his commission into the hands of the French king. Since that time, no native of Great Britain has enjoyed this command. See *Scots GUARDS*.

GENDER, among grammarians, a division of nouns, or names, to distinguish the two sexes.

This was the original intention of gender: but, afterwards, other words, which had no proper relation either to the one sex or the other, had genders assigned them, rather out of caprice than reason; which is at length established by custom. Hence genders vary according to the languages, or even according to the words introduced from one language into another. Thus, *arbor*, in Latin, is feminine; but *arbre*, in French, is masculine: and *dens*, in Latin, is masculine; but *dent*, in French, is feminine.

The oriental languages frequently neglect the use of genders; and the Persian language has none at all; which is no disadvantage, the distinction of genders being in great measure useless.

The Latins, Greeks, &c. generally content themselves to express the different genders by different terminations, as *bonus equus*, "a good horse;" *bona equa*, "a good mare," &c. But in English, we frequently go further, and express the difference of sex by different words: as boar, sow; boy, girl; buck, doe; bull, cow; cock, hen; dog, bitch, &c.—We have only about 24 feminines, distinguished from the males, by the variation of the termination of the male into *ess*; of which number are abbot, abbess; count, countess; actor, actress; heir, heiress; prince, princess, &c. which is all that our language knows of any thing like genders.

The eastern languages, as well as the vulgar languages of the west, have only two genders; the masculine and feminine. The Greek and Latin have likewise the neuter, common, and the doubtful gender; and beside these, they have the epicene, or promiscuous, which under one single gender and termination includes both the kinds:

GENDRE (Lewis le), an esteemed historian, born at Roan. He became canon of Notre-Dame at Paris, subchanor of the same church, and abbot of Notre-Dame at Claire Fontaine in the diocese of Chartres. He wrote a great number of works; the principal of which are, 1. The manners and customs of the French, in the different times of that monarchy. 2. An history of France, in three volumes folio, and in seven volumes duodecimo. 3. The life of Cardinal d'Amboise. He died in 1733, aged 78.

GENDRE (Gilbert Charles le), marquis of St Aubin, counsellor in the parliament of Paris, and afterwards master of requests in the king's household. He wrote several works; but is chiefly distinguished by his *Traite de l'opinion*, 9 vols 12mo. a curious performance, proving, by historic examples, the empire of opinion over the works of art and science. He died at Paris in 1746, aged 59.

GENEALOGY, an enumeration of a series of ancestors; or a summary account of the relations and alliances of a person or family, both in the direct and collateral line.

The word is Greek, *γενεαλογια* which is formed of *γενεα*, "race, or lineage," and *λογια*, "discourse."

In divers chapters and military orders, it is required that

Stuart's
Constit.
Scotland.

Genealogica
||
General.

that the candidates produce their genealogy, to shew that they are noble by so many descents.

GENEALOGICA ARBOR, or *Tree of Consanguinity*, signifies a genealogy or lineage drawn out under the figure of a tree, with its root, stock, branches, &c. The genealogical degrees are usually represented in circles, ranged over, under, and aside each other. This the Greeks called *stemmata*, a word signifying crown, garland, or the like. See the articles **CONSANGUINITY** and **DESCENT**, and the plates there referred to.

GENEP, a strong town of Germany, in the circle of Westphalia, subject to the king of Prussia. E. Long. 4. 20. N. Lat. 51. 42.

GENERAL, an appellation given to whatever belongs to a whole genus.

GENERAL Charge, in law. See **CHARGE to enter Heir**.

GENERAL Terms, among logicians, those which are made the signs of general ideas. See **ABSTRACTION** and **IDEA**.

All things that exist, Mr Locke observes, being particulars, it might be expected that words should be so too in their signification: but we find it quite contrary; for most of the words that make all languages are general terms. This is the effect of reason and necessity. For,

First, it is impossible that every particular thing should have a distinct name; because it is impossible to have distinct ideas of every particular thing; to retain its name, with its peculiar appropriation to that idea.

Secondly, it would be useless, unless all could be supposed to have the same ideas in their minds. For names, applied to particular things, wherof I alone have the ideas in my mind, could not be significant or intelligible to another who is not acquainted with all those particular things which have fallen under my notice.

Thirdly, it would be of no great use for the improvement of knowledge; which, though founded in particular things, enlarges itself by general views; to which things, reduced into sorts under general names, are properly subservient.

In things where we have occasion to consider and discourse of individuals and particulars, we use proper names; as in persons, countries, cities, rivers, mountains, &c. This we see, that jockeys have particular names for their horses, because they often have occasion to maintain this or that particular horse when he is out of sight.

Afterwards observing that a great number of things resemble each other in shape, and other qualities, we frame a general idea that takes in only the qualities in which those many particulars agree; and to this idea we give the name *man*, for example: in which there is nothing new; that which is peculiar to each individual being left out, and only that which is common to all retained. And thus we come to have a general idea and a general name. By the same method the mind proceeds to more general notions and names; as those of animal, substance, being, thing, and such universal terms as stand for any ideas whatsoever.

As to the signification of general words, it is evident they do not barely signify one particular thing; neither do they signify a plurality; but they signify a genus, kind, or sort of things. See the articles **ABSTRACTION** and **GENUS**.

GENERAL Warrant. See **WARRANT**.

GENERAL of an Army, in the art of war, he who commands in chief.

A general ought to be a man of great courage and conduct, to have great experience, and to be of good quality. His conduct appears in establishing his magazines in convenient places; in examining the country, that he may not engage his troops too far while he is ignorant of the means of bringing them off; in substituting them; and in knowing how to take the most advantageous posts, either for fighting or shunning a battle. His experience inspires his army with confidence, and an assurance of victory; and his quality, by creating respect, augments his authority. By his liberality he gets intelligence of the strength and designs of the enemy, and by this means is enabled to take the most successful measures. A general ought likewise to be fond of glory, to have an aversion to flattery, to render himself beloved, and to keep a strict discipline.

The office of a general is, to regulate the march and encampment of the army: in the day of battle, to choose out the most advantageous ground; to make the disposition of the army; to post the artillery; and, where there is occasion, to send his orders by his aids-de-camp. At a siege, he is to cause the place to be invested; to order the approaches and attacks; to visit the works; and to send out detachments to secure his convoys.

GENERAL of the Artillery. See **ORDNANCE**.

GENERAL of Horse, and **GENERAL of Foot**, are posts next under the general of the army, and these have upon all occasions an absolute authority over all the horse and foot in the army.

Adjutant-GENERAL, one who attends the general, assists in council, and carries the general's orders to the army. He distributes the daily orders to the majors of brigade. He is likewise charged with the general detail of the duty of the army. The majors of brigade send every morning to the adjutant-general an exact return, by battalion and company, of the men of his brigade. In a day of battle the adjutant-general sees the infantry drawn up; after which, he places himself by the general, to receive any orders which may regard the corps of which he has the detail. In a siege, he orders the number of workmen demanded, and signs the warrant for their payment. He receives the guards of the trenches at their rendezvous, and examines their condition; he gives and signs all orders for parties. He has an orderly sergeant from each brigade of infantry in the line, to carry such orders as he may have occasion to send from the general.

Lieutenant-GENERAL, is the next in command after the general; and provided he should die or be killed, the order is, that the oldest lieutenant-general shall take the command. This office is the first military dignity after that of a general. One part of their function is, to assist the general with their counsel: they ought therefore, if possible, to possess the same qualities with the general himself; and the more, as they often command armies in chief.

The number of lieutenant-generals have been multiplied of late in Europe, in proportion as the armies have become numerous. They serve either in the field,

General.

General or in sieges, according to the dates of their commissions. In battle, the oldest commands the right wing of the army, the second the left wing, the third the centre; the fourth the right wing of the second line, the fifth the left wing, the sixth the centre; and soon. In sieges, the lieutenant-generals always command the right of the principal attack, and order what they judge proper for the advancement of the siege during the 24 hours they are in the trenches; except the attacks, which they are not to make without an order from the general in chief.

Lieutenant-General of the Ordnance. See ORD-NANCE.

Lieutenant-General of Artillery, is, or ought to be, a very great mathematician, and an able engineer; to know all the powers of artillery; to understand the attack and defence of fortified places, in all its different branches; how to dispose of the artillery in the day of battle to the best advantage; to conduct its march and retreat; as also to be well acquainted with all the numerous apparatus belonging to the train, and to the laboratory, &c.

Major-General, the next officer to the lieutenant-general. His chief business is to receive orders from the general, or in his absence from the lieutenant-general of the day; which he is to distribute to the brigade-majors, with whom he is to regulate the guards, convoys, detachments, &c. On him the whole fatigue and detail of duty of the army roll. It is the major-general of the day who is charged with the encampment of the army, who places himself at the head of it when they march, who marks out the ground of the camp to the quarter-master-general, and who places the new guards for the safety of the camp.

The day the army is to march, he dictates to the field-officers the order of the march, which he has received from the general, and on other days gives them the parole.

In a fixed camp he is charged with the foraging, with reconnoitring the ground for it, and posting the escorts, &c.

In sieges, if there are two separate attacks, the second belongs to him; but if there is but one, he takes, either from the right or left of the attack, that which the lieutenant-general has not chosen.

When the army is under arms, he assists the lieutenant-general, whose orders he executes.

If the army marches to an engagement, his post is at the head of the guards of the army, until they are near enough to the enemy to rejoin their different corps; after which he retires to his own proper post: for the major-generals are disposed on the order of battle as the lieutenant-generals are; to whom, however, they are subordinate, for the command of their divisions. The major-general has one aid-de-camp, paid for executing his orders.

GENERAL is also used for a particular march, or beat of drum; being the first which gives notice, commonly in the morning early, for the infantry to be in readiness to march.

GENERAL is also used for the chief of an order of monks; or of all the houses and congregations established under the same rule. Thus we say, the general of the Franciscans, Cistercians, &c.

GENERATE, in music, is used to signify the operation of that mechanical power in nature, which every sound has in producing one or more different sounds. Thus any given sound, however simple, produces along with itself, its octave, and two other sounds extremely sharp, viz. its twelfth above, that is to say, the octave of its fifth; and the other the seventeenth above, or, in other words, the double octave of its third major.

Whether we suppose this procreation of sounds to result from an aptitude in the texture and magnitude of certain particles in the air, for conveying to our ears vibrations that bear those proportions one to another, as being determined at once by the partial and total oscillations of any musical string; or from whatever economy of nature we choose to trace it; the power of one sound thus to produce another, when in action, is said to *generate*. The same word is applied by Signior Tartini and his followers, to any two sounds which, simultaneously heard, produce a third.

GENERATOR, in music, signifies the principal found or sounds by which others are produced. Thus the lowest C for the treble of the harpsichord, besides its octave, will strike an attentive ear with its twelfth above, or G in alt, and with its seventeenth above, or E in alt. The C, therefore, is called their *generator*, the G and E its products or harmonics. But in the approximation of chords, for G, its octave below is substituted, which constitutes a fifth from the generator, or lowest C; and for E, is likewise substituted its fifteenth below, which, with the abovementioned C, forms a third major. To the lowest notes, therefore, exchanged for these in alt by substitution, the denominations of products or harmonics are likewise given, while the C retains the name of their *generator*. But still according to the system of Tartini, two notes in concord, which when sounded produce a third, may be termed the *concurring generators* of that third. (See *Generation Harmonique*, par M. Rameau; see also that delineation of Tartini's system called *The power and principles of harmony*.)

GENERATING LINE or FIGURE, in geometry, is that which by its motion produces any other plane or solid figure. See **GEOMETRY**.

GENERATION, in physiology, the act of procreating and producing a being similar to the parent.

According to Aristotle, the male animals contain the principle, and the female the matter, of generation; for though both are furnished indeed with a seminal liquor, yet the semen of the males alone is prolific. The moderns, on the other hand, as well those who contend for the system of generation from eggs, as they who adopt that of the animalcules in the male-seed, pretend that females have no such seminal liquor at all, and that what has been commonly taken for it is some other animal-fluid.

Harvey is of opinion, that all females are furnished with eggs; and that the embryos, or young animals, are formed in the same manner as a chick in the egg of any bird. Generation, according to this celebrated physician, is effected wholly by means of the uterus, or womb, which conceives the fetus by a kind of contagion communicated to it by the male-seed, much in the same way as the load-stone communicates magnetism

Generate
Generation.

Generation. successively round the, in the same order which they before occupied in the parent. When a great quantity of the seminal liquors of both sexes is received into the womb, there are formed different spheres of attraction, in different parts of these liquors; the consequence of which is, that several fœtuses are formed at the same time.

Nearly akin to Mr Buffon's system, is that of Mr Maupertuis, which he has explained in his *Venus Physique*. He observes, that all the variety observable among mankind, may have been accidental at first; but being once established in the constitution of the parents, they become natural to their posterity. To illustrate this, he gives an instance of a sexdigitary family at Berlin, who had six fingers, or six toes, and frequently both; and that this peculiarity was transmitted equally by the father and mother, but was lost by alliances with those who had only the usual number of fingers or toes.

He farther observes, that most animals, excepting mankind, have stated seasons for procreation; and that the females go with young some a longer, others a shorter time. Mares go from eleven to twelve months; cows and hinds go nine months, as do also women; foxes and wolves, five months; and bitches go only seven weeks; cats nine weeks; and rabbits but thirty-one days. Most birds are hatched in twenty-one days; the canary-birds, and some others, are hatched in thirteen or fourteen days. It appears, therefore, that there is an endless variety in the time and manner of the generation of animals.

Whoever reads this short sketch of the different theories of generation that have hitherto been invented, will probably require no other arguments to convince him, that physicians and philosophers are still as ignorant of the nature of this mysterious operation as they were in the days of Noah.

Concerning the formation and nutrition of the fœtus after the female has conceived, there have also been great disputes; but as this subject is more easily investigated, and in some measure falls under the notice of our senses, there is much less uncertainty concerning these matters than generation, or the manner in which the embryo is originally formed. The following particulars are confirmed by the greatest number of observations.

About the seventh day, the eye may discover the first lineaments of the fœtus; but these lineaments are as yet very imperfect. Two little vesicles appear in an almost transparent jelly, the largest of which is destined to become the head of the fœtus, and the other smaller one is reserved for the trunk. But at this period no extremities are to be seen; the umbilical chord appears only as a very minute thread, and the placenta does not as yet absorb the red particles of the blood. At the end of fifteen days, not only the head but the features of the face begin to be developed.—The nose

appears like a small prominent line; and we are able to distinguish another line under it, which is destined for the separation of the lips. Two black points appear in the place of eyes, and two minute holes mark the ears. At the sides of the trunk both above and below, we see four minute protuberances, which are the rudiments of the arms and legs. At the end of three weeks the body of the fœtus is somewhat augmented, and both the hands and feet are to be distinguished. The upper extremities are found to increase faster than the lower ones, and the separation of the fingers is accomplished sooner than that of the toes.

Towards the end of the first month, the fœtus is about an inch long, and the human form may be decisively ascertained: all the parts of the face may be distinguished; the shape of the body is clearly marked out, the haunches and the abdomen are elevated, the fingers and toes are separated from each other, and the intestines appear like minute threads. After six weeks the fœtus is grown much longer, and the human figure appears to be more perfect, but the head is still larger in proportion than the other parts of the body.

At the end of the second month, the fœtus measures two inches and a quarter; at the end of the third month, three inches and a half; and about the fourth or fifth month, usually about five inches; and from that time to the end of the ninth month, it gradually increases to about the length of twelve inches, sometimes more, and sometimes not quite so much.

The fœtus during all this time assumes an oval figure, which corresponds with the shape of the uterus. Its chin is found reclining on its breast, with its knees drawn up towards its chin, and its arms folded over them. But it seems likely that the posture of some of these parts is varied in the latter months of pregnancy, so as to cause those painful twitches which its mother usually feels from time to time.—In natural cases, its head is probably placed towards the os tincæ from the time of conception to that of its birth; though formerly it was considered as being placed towards the fundus uteri, till about the eighth or ninth month, when the head, by becoming specifically heavier than the other parts of the body, was supposed to be turned downwards.

The capacity of the uterus increases in proportion to the growth of the fœtus, but without becoming thinner in its substance, as might naturally be expected.—The nourishment of the fœtus, during all this time, seems to be derived from the placenta, which appears to be originally formed by that part of the ovum which is next the fundus uteri. The remaining unconnected part of the ovum, and likewise the surface of the placenta, are covered by a membrane called *chorion* (A), within which is another pellucid membrane called *amnios* (B); and these two include a watery fluid, which is the *liquor amnii*, in which the fœtus

(A) Besides these two membranes, Dr Hunter has discovered a third, which is the exterior one, being supposed to be a lamella from the inner surface of the uterus. In the latter months of pregnancy it becomes gradually thinner and more connected with the chorion. He has named it *membrana caduca*.

(B) In some quadrupeds, the urine appears to be conveyed from the bladder through a canal called *urachus*, to the *allantois*; which is a reservoir, resembling a long and blind gut, situated between the chorion and amnios. The human fœtus seems to have no such reservoir, though some writers have supposed that it does exist. From the top of the bladder, a few longitudinal fibres are extended to the umbilical chord; and these fibres have been considered as the urachus, though without having ever been found pervious.

Generation
||
Genesis.

fetus floats till the time of its birth (c).—In the first months of pregnancy, the involucra bear a large proportion to their contents, but this proportion is afterwards reversed as the fetus increases in bulk.

The *placenta*, which is the medium through which the blood is conveyed from the mother to the fetus, and the manner in which this conveyance takes place, deserve to be clearly described, as being a subject not generally understood.—Without such an explanation it might perhaps be readily supposed, that the arteries of the uterus pass into the substance of the placenta; and that the blood, after being conveyed through the umbilical arteries to the fetus, is returned back by the umbilical vein to the placenta, and from thence to the uterus.—Such an idea, however, would be a very erroneous one, and we shall point out the true manner in which this process is conducted.

The *placenta* is a broad, flat, and spongy substance, like a cake, closely adhering to the inner surface of the womb, usually near the fundus, and appearing to be made up by the ramifications of the umbilical arteries and vein. The arteries of the uterus discharge their contents into the spongy cells of this cake; and the veins of the placenta, absorbing the blood from these cells in the same manner as they absorb it in the corpora cavernosa penis, at length form the *umbilical vein*, which passes on to the liver, and from thence to the heart of the fetus, by the *vena cava*. Its circulation, however, through the heart is not conducted in the fetus as it is in the adult: in the latter, the blood is carried from the right auricle of the heart through the pulmonary artery, and is returned to the left auricle by the pulmonary vein; but a dilatation of the lungs is essential to the passage of the blood through the pulmonary artery, and this dilatation cannot take place till after the child is born and has respired. This deficiency, however, is supplied in the fetus, by an immediate communication between the right and left auricle of the heart, through an oval opening in the septum, which divides the two auricles, called *foramen ovale*. The blood is returned again from the fetus, through two arteries called the *umbilical arteries*, which sometimes arise from the iliacs, and sometimes from the aorta descendens. These two vessels taking a winding course with the vein, form with that, and the membranes by which they are surrounded, what is called the *umbilical cord*. These arteries, after ramifying through the substance of the placenta, open and discharge their blood into its cells, from whence it is absorbed by the veins of the uterus; so that a constant deposition and absorption are carried on, and the fetus is found to have a circulation independent of its mother.

GENERATION of Fishes. See FISH.

GENERATION of Plants. See BOTANY, sect. v.

GENERATION of Insects. See INSECTS.

PARTS of GENERATION. See ANATOMY, n° 371, 372.

GENESIS, among mathematicians, signifies the formation or production of some figure or quantity.

GENESIS, among divines, a canonical book of the

Old Testament, and the first of the pentateuch or five books of Moses. The Hebrews call it *Berechith*, or, "In the beginning," these being the first words in the book. The Greeks gave it the name of *Genesis*, from its beginning with the history of the creation of the world. See BIBLE.

GENET, GENNET, or *Jennet*, in the manege, denotes a small-sized well-proportioned Spanish horse.

To ride *a la genet*, is to ride after the Spanish fashion, so short, that the spurs bear upon the horse's flank.

GENETTE, in zoology. See VIVERRA.

GENEVA, a city near the confines of France and Switzerland, in E. Long. 6. o. N. Lat. 46. 20. It has a small territory subject to it, and is a republic *.

The city, called in Latin also *Genæva*, in German *Genf*, and in French *Genève*, is situated where the Rhone makes it exit from the lake, 65 miles from Bern, 75 from Lyons, and 106 from Turin. A part of it stands on an island in the Rhone, and part on the banks on both sides, being a handsome well-fortified city, and pretty large. In some of the streets are arched walks or piazzas. The *Treille* is a most charming place, planted with linden trees; and commanding a fine prospect of the lake, and of several ranges of mountains and rocks rising behind one another, some covered with vineyards and herbage, and others with snow, with openings betwixt them. Immediately below the city, the Rhone is joined by the Arve. Over the former of these rivers are four bridges. The inhabitants of Geneva are mostly Calvinists. Of the six churches, the cathedral of St Peter is the principal, in which is a monument to the memory of Henry duke of Rohan. The service in some of these churches is in French, in others in Italian, and in others in German. The guildhall is a stately free-stone edifice, situated on an eminence, the ascent to which is without any steps, so that a person may not only walk, but ride from the top to the bottom. Here is an arsenal, which is said to contain arms for 12,000 men; and an university, which has 12 professors belonging to it, with a very valuable library. Several learned men have either been natives, or professors and ministers, of this city; particularly Calvin, Theodore Beza, the Diodati, the Turretines, the late Mr Le Clerc, and others. As the quantity of corn produced in the territory of the city is not sufficient for the consumption of the inhabitants, the republic has erected large granaries, which always contain a quantity to supply the inhabitants two years. The bakers, the inn-keepers, the garrison, and the artificers, employed by the city, are obliged to take what corn they want from these granaries, at a small advance of the prime cost. Besides the revenue arising from hence, the city has other incomes, amounting to about 130,000 dollars, with part of which it maintains a garrison consisting of 800 men, well disciplined, and clothed in a blue uniform turned up with red. The environs of the city are extremely pleasant; which, with the goodness of the air and provisions, the mildness of the go-

Genet
||
Genève

* See Switzerland.

(c) The *liquor amnii* coagulates like the lymph. It has been supposed to pass into the oesophagus, and to afford nourishment to the fetus; but this does not seem probable. Children have come into the world without an oesophagus, or any communication between the stomach and the mouth; but there has been no well-attested instance of a child's having been born without a placenta; and it does not seem likely that any of the fluid can be absorbed through the pores of the skin, the skin in the fetus being everywhere covered with a great quantity of mucus.

Geneva

vernment, the politeness of the inhabitants, the numbers of foreign gentlemen always residing here, or passing from France, Germany, and other countries, to the north of the Alps, to Italy, and others lying south of them, render it a most agreeable place: hence Mr Addison styled it, very justly, the *court of the Alps*. In all the streets are fountains and canals to supply the inhabitants with water, which is raised by engines from the Rhone. The trade of the city is very considerable, it being a great thoroughfare, and having a variety of manufactures, with a number of industrious and ingenious artificers, particularly in the watchmaking branch. The library belonging to the city is well furnished with excellent books, besides a curious collection of medals and petrifications, and some ancient manuscripts. They are not so rigid in keeping the sabbath here as the Calvinists in England and Scotland: for they tolerate, and even authorize, all manner of manly exercises on Sundays, after divine service; and then it is that the militia also are exercised. The fun rises later here, and sets sooner, than in most other places of the same latitude; which is owing to the Alps. Mr Addison says, that there are merchants in Geneva who are reckoned worth two millions of crowns, tho', perhaps, not one of them spends 500 pounds a-year. At the general hospital, besides the city poor, poor travellers are maintained for one day, and then dismissed, with some money in their pockets, to proceed on their journey. As to the government, it is much like that of Zurich and Bern. The number of burghers is about 1500, and the principal magistrates are the four syndics. There are no less than four councils, viz. the general council of the citizens and burghers, the council of 200, that of 60, and that of 25. Of the last, two persons of the same family cannot be members at the same time. A son here, who refuses to pay his father's debts, is incapable of any office in the state. No marriages are permitted unless both parties are of the Protestant religion. A woman of 40 years of age must not marry a man of less than 30; if she exceed 40, her husband must at least be 35; nor must a man above 60 marry a woman, who is not, at least, 30. A widow must not alter her condition in less than six months after her husband's decease. The kings of France and Britain are constantly mentioned in their public prayers here. It is said that Calvin lied buried in that part of the church-yard called the *Plain-palais*; but the particular spot is either not known, or pretended not to be known. Before the reformation, this city was the see of a bishop, who was possessed of the sovereignty thereof at first, jointly with its counts, and afterwards with the dukes of Savoy; but it got rid of both, about the period abovementioned, and entered into alliance with several of the cantons: at present, however, those only with Bern and Zurich continue in force. The king of France always keeps a resident here. So much are the magistracy afraid of opening a door to luxury and licentiousness, that no theatre is permitted in the city. The lake, to which it gives name, resembles a half-moon, whose convex side lies towards Switzerland. On that side it extends 18 leagues, reckoning along the shore, but on the Savoy side not above 12; and its greatest breadth is upwards of seven. As for its depth, in some places it is said to be unfathomable. Contrary to most other lakes, it decreases

Vol. V.

Geneva
Genista.

in winter, and increases in summer, which is owing to the melting of the snow in the neighbouring mountains. It is hardly ever frozen over; and has the territories of no less than five different states bordering on it, viz. the kingdom of France, the duchy of Savoy, the canton of Bern, the bishopric of Sion, and the republic of Geneva.

GENEVA, or *Gin*, among distillers, an ordinary malt spirit, distilled a second time, with the addition of some juniper-berries.

Originally, the berries were added to the malt in the grinding; so that the spirit thus obtained was flavoured with the berries from the first, and exceeded all that could be made by any other method. At present, they leave out the berries entirely, and give their spirits a flavour by distilling them with a proper quantity of oil of turpentine; which, though it nearly resembles the flavour of juniper-berries, has none of their valuable virtues.

GENGISKHAN, the renowned sovereign of the Moguls, a barbarous and bloody conqueror. See JENGHIZ KHAN, and (*History of the*) MOGULS.

GENIAL, an epithet given by the Pagans to certain gods who were supposed to preside over generation.

The genial gods, says Festus, were earth, air, fire, and water. The twelve signs, together with the sun and moon, were sometimes also ranked in the number.

GENII, a sort of intermediate beings, by the Mahometans believed to exist, between men and angels. They are of a grosser fabric than the latter, but much more active and powerful than the former. Some of them are good, others bad, and they are capable of future salvation or damnation like men. The Orientals pretend that these geni inhabited the world many thousand years before the creation of Adam, under the reigns of several princes, who all bore the common name of Solomon: but falling at length into an almost general corruption, Eblis was sent to drive them into a remote part of the earth, there to be confined: that some of that generation still remaining were by Tahmurath, one of the ancient kings of Persia, forced to retreat into the famous mountains of *Kaf*; of which successions and wars they have many fabulous and romantic stories. They also make several ranks and degrees among this kind of beings, (if they are not rather different species); some being absolutely called *Jin*; some *Peri*, or fairies; some *Div*, or giants; and other *Tacwirs*, or fates.

GENIOGLOSSI, in anatomy. See ANATOMY, *Table of the muscles*.

GENIOHYOIDÆUS, in anatomy. *Ibid*.

GENISTA, BROOM or DYERS-WEED; a genus of the decandria order, belonging to the diadelphia class of plants. There are several species of which the most remarkable are, the cytisio-genista, or common broom; and the tinctoria, or dyers-weed.—The first is too well known to need description. Its young flowers are sometimes preserved as pickles; and the plant, when burnt, affords a tolerably pure alkaline salt. Dr Mead relates the case of a dropical patient that was cured by taking half a pint of a decoction of green broom tops, with a spoonful of whole white mustard-seed, every morning and evening. The patient had been tapped three times, and tried the usual remedies before. An infusion of the seeds, drank

18 Q

freely

Geniil
Genius.

Genius.

freely, has been known to produce similar happy effects; but these are by no means to be expected in every instance. Cows, horses, and sheep, refuse the plant.—2. The tinctoria is also a native of Britain. It rises with shrubby stalks three feet high, garnished with spear-shaped leaves placed alternate, and terminated by several spikes of yellow flowers, succeeded by pods. The branches of the plant are used by dyers, for giving a yellow colour; from whence it is called dyers-broom, green-wood, wood-waxen, or dyers-weed. A dram and an half of the powdered seeds operates as a mild purgative. A decoction of the plant is diuretic; and, like the former, has proved serviceable in dropical cases. Horses, cows, goats, and sheep, eat it.

GENITAL, an appellation given to whatever belongs to the parts of generation. See ANAT. n° 371.

GENITES, among the Hebrews, those descended from Abraham, without any mixture of foreign blood.

The Greeks distinguished by the name of *genites* such of the Jews as were issued from parents, who, during the Babylonish captivity, had not allied with any gentile family.

GENITIVE, in grammar, the second case of the declension of nouns. The relation of one thing considered as belonging in some manner to another, has occasioned a peculiar termination of nouns, called the *genitive case*: but, in the vulgar tongues, they make use of a sign to express the relation of this case. In English they prefix the particle *of*; in French *de* or *du*, &c. Though in strictness there are no cases in either of these languages; inasmuch as they do not express the different relations of things by different terminations, but by additional prepositions, which is otherwise in the Latin.

GENIUS, a good or evil spirit, or demon, whom the ancients supposed set over each person, to direct his birth, accompany him in life, and to be his guard. See DEMON.

Among the Romans, Festus observes, the name *genius* was given to the god who had the power of doing all things, *deum qui vim obtineret rerum omnium gerendarum*; which Vossius, *de Idol.* rather chooses to read *genendarum*, who has the power of producing all things; by reason Censorinus frequently uses *gerere* for *gignere*.

Accordingly, St Augustin *de Civitat. Dei*, relates, from Varro, that the genius was a god who had the power of generating all things; and presided over them when produced.

Festus adds, that Aufusilius spake of the *genius* as the Son of God, and the Father of men, who gave them life; others, however, represented the *genius* as the peculiar or tutelary god of each place: and it is certain, the last is the most usual meaning of the word. The ancients had their *genii* of nations, of cities, of provinces, &c. Nothing is more common than the following inscription on medals, GENIUS POPULI ROM. "the genius of the Roman people;" or GENIO POP. ROM. "to the genius of the Roman people." In this sense, *genius* and *lar* were the same things; as, in effect, Censorinus and Apulius affirm they were. See LARES and PENATES.

The Platonists, and other eastern philosophers, up-

posed the *genii* to inhabit the vast region, or extent of air, between earth and heaven. They were a sort of intermediate powers, who did the office of mediators between gods and men. They were the interpreters and agents of the gods; communicated the wills of the deities to men; and the prayers and vows of men to the gods. As it was unbecoming the majesty of the gods to enter into such trifling concerns; this became the lot of the *genii*, whose nature was a mean between the two; who derived immortality from the one, and passions from the other; and who had a body framed of an aerial matter. Most of the philosophers, however, held, that the *genii* of particular men were born with them, and died; and Plutarch attributes the ceasing of oracles partly to the death of the *genii*. See ORACLE.

The heathens, who considered the *genii* as the guardians of particular persons, believed that they rejoiced and were afflicted at all the good and ill fortune that befel their wards. They never, or very rarely, appeared to them; and then only in favour of some person of extraordinary virtue or dignity. They likewise held a great difference between the *genii* of different men; and that some were much more powerful than others: on which principle it was, that a wizard in *Apian* bids Anthony keep at a distance from Octavius, by reason Anthony's genius was inferior to and stood in awe of that of Octavius. There were also evil *genii*, who took a pleasure in persecuting men, and bringing them evil tidings: such was that in *Paterculus*, &c. which appeared to Brutus the night before the battle of Philippi. These were also called *larvæ*, and *lemures*. See LARVÆ and LEMURES.

GENIUS, in matters of literature, &c. a natural talent or disposition to do one thing more than another; or the aptitude a man has received from nature to perform well and easily that which others can do but indifferently and with a great deal of pains.

To know the bent of nature is the most important concern. Men come into the world with a genius determined not only to a certain art, but to certain parts of that art, in which alone they are capable of success. If they quit their sphere, they fall even below mediocrity in their profession. Art and industry add much to natural endowments, but cannot supply them where they are wanting. Every thing depends on genius. A painter often pleases without observing rules; whilst another displeases though he observes them, because he has not the happiness of being born with a genius for painting.

A man born with a genius for commanding an army, and capable of becoming a great general by the help of experience, is one whose organical conformation is such, that his valour is no obstruction to his presence of mind, and his presence of mind makes no abatement of his valour. Such a disposition of mind cannot be acquired by art: it can be possessed only by a person who has brought it with him into the world.—What has been said of these two arts may be equally applied to all other professions. The administration of great concerns, the art of putting people to those employments for which they are naturally formed, the study of physic, and even gaming itself, all require a genius. Nature has thought fit to make a distribution of her talents among men, in order to render them necessary to

to one another; the wants of men being the very first link of society: she has therefore pitched upon particular persons, to give them aptitude to perform rightly some things which she has rendered impossible to others; and the latter have a greater facility granted them for other things, which facility has been refused to the former. Nature, indeed, has made an unequal distribution of her blessings among her children; yet she has disinherited none; and a man divested of all kinds of abilities, is as great a phenomenon as an universal genius.

From the diversity of genius, the difference of inclination arises in man, whom nature has had the precaution of leading to the employments for which she designs them, with more or less impetuosity in proportion to the greater or lesser number of obstacles they have to surmount, in order to render themselves capable of answering this vocation. Thus the inclinations of men are so very different, because they follow the same mover, that is, the impulse of their genius. This, as with the painter, is what renders one poet pleasing, even when he trespasses against rules; while others are disagreeable, notwithstanding their strict regularity.

The genius of these arts, according to the abbe du Bos, consists in a happy arrangement of the organs of the brain; in a just conformation of each of these organs; as also in the quality of the blood, which disposes it to ferment, during exercise, so as to furnish plenty of spirits to the springs employed in the functions of the imagination. Here he supposes that the composer's blood is heated; for that painters and poets cannot invent in cool blood; nay, that it is evident they must be wrapt into a kind of enthusiasm when they produce their ideas. Aristotle mentions a poet who never wrote so well as when his poetic fury hurried him into a kind of frenzy. The admirable pictures we have in Tasso of Armida and Clorinda, were drawn at the expense of a disposition he had to real madness, into which he fell before he died. "Do you imagine," (says Cicero,) that Pacuvius wrote in cold blood? No, it was impossible. He must have been inspired with a kind of fury, to be able to write such admirable verses."

GENOA, a city of Italy, and capital of a republic of the same name, situated in E. Long. 9. 30. N. Lat. 44. 30.—By the Latin authors it is very frequently, though corruptly, called *Janna*; and its present territories made part of the ancient Liguria. The æra of its foundation is not known. In the time of the second Punic war it was a celebrated emporium; and having declared for the Romans, was plundered and burnt by Mago the Carthaginian. It was afterwards rebuilt by the Romans; and with the rest of Italy continued under their dominion till the decline of the western empire in 476. Soon after, it fell under the power of Theodoric the Ostrogoth; who having defeated the usurper Odoacer, became king of Italy. This happened in the year 498; and in a short time, the Goths being almost entirely subdued by Belisarius the emperor Justinian's general, Genoa was reannexed to the Roman empire. In 1638, it was plundered and burnt by the Lombards, whose king Protharis erected it into a provincial dukedom.

The Lombards continued masters of Genoa till the

year 774, when they were conquered by Charles the Great, son to Pepin, king of France. He reduced Liguria to the ancient bounds settled by Augustus, and erected it into a marquisate; appointing his relation *Audemarus* the first count or margrave. Genoa at this time being distinguished for its wealth and populousness, began to give its name to the whole coast; and continued under the dominion of these counts for about 100 years, till the race of the Pepins became entirely extinct in Italy, and the empire was transferred to the German princes.—In the year 935 or 936, while the Genoese forces were absent on some expedition, the Saracens surprised the city, which they plundered and burnt, putting to death a great number of the inhabitants, and carrying others into captivity. Having embarked their captives, together with an immense booty, they set sail for Africa: but the Genoese immediately returning, pursued the invaders; and having entirely defeated them, recovered all the captives and booty, and took a great many of the enemy's ships.

About the year 950, the Franks having lost all authority in Italy, the Genoese began to form themselves into a republic, and to be governed by their own magistrates, who were freely elected, and took the name of *Consuls*. In order to support their independence, they applied themselves with great assiduity to commerce and navigation; and being apprehensive that some of the German emperors, who frequently entered Italy as invaders, might renew their pretensions to their state, they consented to acknowledge Berengarius III. duke of Friuli, who had been elected emperor by a party of Italian nobles. Berengarius, who had much ado to maintain himself in his new dignity, endeavoured by his concessions to enlarge the number of his friends and adherents; and accordingly made no difficulty to confirm the new republic in all its rights and privileges. After this the Genoese began to extend their commerce from Spain to Syria, and from Egypt to Constantinople; their vessels, according to the custom of these times, being fitted for fighting as well as merchandise. Having thus acquired great reputation, they were invited, in 1017, by the Pisans, who had likewise formed themselves into a republic, to join with them in an expedition against Sardinia, which had been conquered by the Moors. In this expedition they were successful; the island was reduced; but from this time an enmity commenced between the two republics, which did not end but with the ruin of the Pisans.

The first war with Pisa commenced about 30 years after the Sardinian expedition, and lasted 18 years; when the two contending parties having concluded a treaty of peace, jointly sent their forces against the Moors in Africa, of whom they are said to have killed 100,000. The Genoese were very active in the time of the crusades, and had a principal share in the taking of Jerusalem. They also waged considerable wars with the Moors in Spain, of whom they generally got the better. They also prevailed against the neighbouring states; and, in 1220, had enlarged their territories beyond the skirts of the Apennines, so that the rest of Italy looked upon them with a jealous eye: but in 1314 the factions which had for a long time reigned in the city, notwithstanding

standing all its wealth and power, induced the inhabitants to submit themselves for 20 years to the dominion of Henry VII. emperor of Germany. That emperor, however, died in August 1312; and the vicar he had left, soon after went to Pisa, upon which the dissensions in Genoa revived with greater fury than ever. In 1317, a quarrel happened between the families of Spinola and Doria; which came to such an height, that both parties fought in the streets for 24 days without intermission, raised battering engines against each others houses, and filled the city with blood. At last the Spinola quitted the city, and retired to their territories in the Apennine mountains. The civil war continued till the year 1331; when, by the mediation of the king of Naples, it was concluded, that all exiles should return to the city; that the republic should be governed by the king's vicar; and all the offices of the state be equally divided between the Guelphs and the Gibellines, the two contending parties.

By this ruinous war, the coast of Genoa, formerly adorned with palaces and vineyards, was now reduced to the appearance of a barren waste. So great was the general desolation, that, according to Petrarch, the spectators who failed along were struck with astonishment and horror. Villani, a cotemporary author, relates, that it was supposed by the learned, that greater exploits had not been performed at the siege of Troy; and that the losses each party had sustained would have been sufficient to have purchased a kingdom, the Genoese republic being in his time the richest and most powerful state in Christendom. The annalist Stella informs us, that, before the war, the most extravagant profusion and luxury prevailed among the Genoese: but that, towards the end, many noble families were reduced to indigence and poverty; so that, about 100 years after, it became fashionable for the nobles to live in a plain manner, without any show or magnificence.

In 1336, both parties, suspending their mutual animosities, sent two fleets of 20 galleys each into the German ocean, to the assistance of the king of France, who was engaged in a war with Edward III. king of England. This naval expedition proved the cause of a most remarkable revolution in the Genoese government. The sailors of the fleet, thinking themselves injured by their officers, whom they accused of defrauding them of their pay, proceeded to an open mutiny; and, having expelled the admiral and other commanders, seized the galleys. The king of France being chosen arbitrator, decided in favour of the officers, and imprisoned 16 of the chiefs of the mutineers. Upon this several of the sailors left the fleet, and returned to Genoa; where they went round the coasts, repeating their mutinous complaints, which were greatly hearkened to, upon a false report that the mutineers who had been imprisoned were broke upon the wheel. The factious spirit increased; and at last the Genoese insisted in a tumultuous manner for having an abbot of their own choosing, and 20 of the people with the consent of the captains of the republic assembled for that purpose. While the mob were impatiently expecting their decision, a mechanic, generally accounted a fool, mounted a wooden bench, and called out that one Simon Bucanigree should be chosen abbot. This be-

ing instantly echoed by the populace, he was first declared *abbot*, then *lord*, and at last *duke* of Genoa.

This new expedient did not at all answer the purpose. The dissensions continued as violent as ever, notwithstanding the power of the new magistrates; and by these perpetual divisions the republic was at last so much weakened, that in 1390 the king of France was declared lord of Genoa. Under the French government, however, they soon became exceedingly impatient; and, in 1422, the duke of Milan obtained the sovereignty. With this situation they were equally displeased, and therefore revolted in 1436. Twenty-two years after, finding themselves pressed by a powerful fleet and army sent by Alphonso king of Naples, they again conferred the sovereignty of their state upon the king of France. In 1460, they revolted from the French; and, four years after, put themselves again under the protection of the duke of Milan; from whom they revolted in 1478. He again declared sovereign of the republic in 1488; and, 11 years after, the city and territories of Genoa were conquered by Lewis XII. of France.

The almost unparalleled fickleness of the Genoese disposition was not to be corrected by this misfortune. They revolted in 1506; but next year were again subdued by Lewis. Six years after, they again revolted; and in 1516, the city was taken and plundered by the Spaniards. In 1528, Andrew Doria, a Genoese admiral, in the service of the French, undertook to rescue his country from the dominion of foreign princes, and restore it to its liberty. Knowing well the fickle disposition of his countrymen, he took all occasions of exciting discontents among them against the government. He persuaded them, that the French (who had again obtained the sovereignty) had left them only a shadow of liberty, while they pretended to protect them from their enemies. To the nobility he represented the disgrace of suffering the government to be vested in the hands of foreigners less worthy of authority than themselves. Thus he soon formed a strong faction, and formed his plan; for the execution of which he took the most proper time, namely, when almost three-fourths of the French garrison had been carried off by the plague.—He advanced with 500 men; and his friends having opened the gates of the city to him, he seized the principal posts, and thus became master of it without drawing his sword. The garrison retired to the forts, where they soon after capitulated, and being driven out of the city, Doria re-established the ancient form of government *.

The republic hath since continued to preserve her liberty, though greatly fallen from her ancient splendor, and now become a very inconsiderable state. In 1684, the Genoese had the misfortune to fall under the resentment of Lewis XIV. at which time the city was almost destroyed by a formidable bombardment. In the year 1688, it was bombarded by admiral Byng, and forced to capitulate; but there were at that time no views of making a permanent conquest of the city. In 1730, the island of Corsica revolted from the Genoese, and could never afterwards be reduced by them; for which reason it was sold to the French, who in the year 1770 totally reduced it.

The Genoese territories extend along that part of the Mediterranean sea, commonly called the *gulf of Genoa*,

* See
DORIA.

Genoa, about 152 miles; but their breadth is very unequal, being from eight to about 20 miles. Where they are not bounded by the sea, the following states and countries, taking them from west to east, are their boundaries, *viz.* Piedmont, Monferat, Milan, Placentia, Parma, the dukedom of Tuscany, and the republic of Lucca. This tract, though a great part of it is mountainous, and some of that barren enough, yet produces plenty of excellent fruit, good pasture, wood, garden-stuff, and mulberry-trees, with some wine and oil, but little corn. What they want of the lake, they have either from Lombardy, Sicily, or Naples.

Genoa stands on the coast of the Mediterranean sea, at the bottom of a little gulph, partly on the flat, and partly on the declivity, of a pleasant hill; in consequence of which, it appears to great advantage from the sea. It is defended on the land-side a by double wall, which in circumference is about ten Italian miles. Two of the streets consist entirely of a double straight row of magnificent palaces. The others, though clean and well paved, are crooked and narrow. The palaces of the nobility are almost all of marble, and many of them are painted on the outside. That there should be such a profusion of marble here, is not to be wondered at, as the neighbouring hills abound with it. The city contains a vast number of palaces, churches, and convents, and several hospitals. The palace where the doge resides, and where the great and little council, and the two colleges of the procuratori and governor's assembly, is a large stone building in the centre of the city: but it contains some fine paintings in fresco; two statues of Andrew and John Doria in white marble; and an arsenal, in which are said to be arms for thirty-four thousand men, with a shield, containing one hundred and twenty pistol-barrels, and thirty-three coats of mail, which, it is pretended, were worn by as many Genoese heroines in a crusade. Of the churches, the finest are those of the annunciation, St Mary Carignan, St Dominic, and St Martha. In the cathedral is a dish made of a single emerald. All the inhabitants here, except the principal ladies, who are carried in chairs, walk on foot, on account of the narrowness or steepness of the streets. The fortifications of the city, towards the sea, are remarkably strong. There are two fine stone-bridges over the rivers Bonzevera and Bisagno, the first whereof washes the west, and the other the east side of the city, within which there is also a surprising stone-bridge joining two hills. The harbour, though large, is far from being safe; but no care or expence have been spared, to render it as safe and commodious as possible. The wind to which it is most exposed, is that called *Labecce*, or the south-west. The place where the republic's galleys lie, is called the *Darsena*, where are a great number of Turkish slaves. On a rock, on the west side of the harbour, is the fanal or light-house, a high tower, on the top of which is a lantern, containing thirty-six lamps. The trade of Genoa is chiefly in velvets, damasks, plush, and other silks, brocades, lace, gloves, sweetmeats, fruits, oil, Parmesan cheese, anchovies, and medicinal drugs from the Levant; but the badness of the harbour, and the high price of commodities, greatly check its commerce. In 1751, Genoa was declared a free port for ten years, under certain

restrictions: in that called *Porto Franco*, any merchant may have a ware-house, and import or export goods duty free; but such as are disposed of in the city, or on the continent, are taxed pretty high. The nobility are allowed to trade in the wholesale way; to carry on velvet, silk, and cloth manufactures; and to have shares in merchant-ships: and some of them, as the Palavacini, are actually the greatest merchants in Genoa. Another very profitable article of trade carried on by them is banking, and dealing in bills of exchange. A new academy of painting, sculpture, civil and military architecture, was instituted here in 1751. One may walk the streets of Genoa in the night with the greatest safety, which is more than can be said of many cities in Italy. Excessive splendor and luxury are, in several respects, restrained by salutary laws. No beggars are permitted to ask alms in Genoa, and the inns are better than those at Turin. When a single person is buried, a kind of garland of all sorts of artificial flowers is placed on the coffin. The Genoese in general are esteemed crafty, industrious, and inured to labour above the other Italians.

GENSING. See PANAX.

GENTIANA, GENTIAN, in botany, a genus of the digynia order, belonging to the pentandria class of plants. The most remarkable species are the following:

1. The lutea, or common gentian of the shops. It is a native of the mountainous parts of Germany; from whence the roots, the only part used in medicine, are brought to this country. These have a yellowish-brown colour, and a very bitter taste. The lower leaves are of an oblong oval shape, a little pointed at the end, stiff, of a yellowish green, and have five large veins on the back of each. The stalk rises four or five feet high, garnished with leaves growing by pairs at each joint, almost embracing the stalk at their base. They are of the same form with the lower, but diminish gradually in their size to the top. The flowers come out in whorls at the joints on the upper part of the stalks, standing on short foot-stalks, whose origin is in the wings of the leaves. They are of a pale yellow colour.—The roots of this plant are very frequently used in medicine as stomachic bitters. In taste they are less exceptional than most of the substances of this class. Infusions of gentian-root flavoured with orange-peel, are sufficiently grateful. Some years ago a poisonous root was discovered among the gentian brought to London; the use of which occasioned violent disorders, and in some cases death. This root is easily distinguished from the gentian, by its being internally of a white colour, and void of bitterness.

2. The centaureum, or lesser centaury of the shops, is a native of many parts of Britain. It grows on dry pastures; and its height is commonly proportioned to the goodness of the soil, as in poor soils it will grow to the height of a foot, but in rich ones not above three or four inches. It is an annual plant, with upright branching stalks, garnished with small leaves, placed by pairs. The flowers grow in form of an umbel at the top of the stalk, and are of a bright purple colour. They come out in July, and the seed ripens in autumn. The plant cannot be cultivated in gardens. The tops are an useful aperient bitter, in which.

Gentile,
Gentleman.

which view they are often used in the present practice of medicine.

GENTILE, in matters of religion, a Pagan, or worshippier of false gods.

The origin of this word is deduced from the Jews, who called all those who were not of their name גוֹיִם *gojim*, i. e. *gentes*, which in the Greek translations of the Old Testament is rendered γέντιος; in which sense it frequently occurs in the New Testament; as in Matth. vi. 32. "All these things the nations or Gentiles seek." Where the Latin church also used *gentes* in the same sense as our *Gentiles*, especially in the New Testament. But the word *gentes* soon got another signification, and no longer meant all such as were not Jews; but those only who were neither Jews nor Christians, but followed the superstitions of the Greeks and Romans, &c. In this sense it continued among the christian writers, till their manner of speech, together with their religion, was publicly and by authority received in the empire; when *gentiles*, from *gentes*, came into use: and then both words had two significations, viz. in treaties or laws concerning religion, they signified Pagans, neither Jews nor Christians; and in civil affairs, they were used for all such as were not Romans.

GENTILE, in the Roman law and history, a name which sometimes expresses what the Romans otherwise called *barbarians*, whether they were allies of Rome or not: but this word was used in a more particular sense for all strangers and foreigners not subject to the Roman empire.

GENTILIS (Albericus), professor of civil law at Oxford; an Italian by birth. He had quitted Italy with his father, on account of religion. He wrote several works; three books, in particular, *De jure belli*, which have not been unserviceable to Grotius. He died at London in 1608.

GENTILIS (Scipio), brother to the former, and as celebrated a civilian as he, forsook his native country that he might openly profess the Protestant religion. He was counsellor of the city of Nuremberg, and professor of law with uncommon reputation. He was a great humanist; and in his lectures, as well as books, mixed the flowers of polite learning with the thorns of the law. He died in 1616.

GENTLEMAN. Under this denomination are comprehended all above the rank of women*, whereby noblemen are truly called *gentlemen*.

A gentleman is usually defined to be one who, without any title, bears a coat of arms, or whose ancestors have been freemen; and by the coat that a gentleman giveth, he is known to be, or not to be, descended from those of his name that lived many hundred years since.

The word is formed of the French *gentilhomme*; or rather of *gentil*, "fine, fashionable, or becoming;" and the Saxon *man*, q. d. *honestus*, or *honesto loco natus*.—The same signification has the Italian *gentiluomo*, and the Spanish *hidalgo*, or *hijo dalgo*, that is, the son of somebody, or of a person of note.—If we go farther back, we shall find *gentleman* originally derived from the Latin *gentilis homo*; which was used among the Romans for a race of noble persons of the same name, born of free or ingenuous parents, and whose ancestors had never been slaves or put to death by law. Thus Cicero,

in his *Topics*, "*Gentiles sunt, qui inter se eodem sunt nomine, ab ingenuis oriundi, quorum majorum nemo servitutem servavit, qui capite non sunt diminuti*, &c.—Some hold that it was formed from *gentile*, i. e. pagan; and that the ancient Franks, who conquered Gaul, which was then converted to Christianity, were called *gentiles* by the natives, as being yet heathens.—Others relate, that towards the declension of the Roman empire, as recorded by Ammianus Marcellinus, there were two companies of brave soldiers, the one called *gentiliun*, and the other *scutarii* *um*; and that it was hence we derive the names *gentleman* and *esquire*. See *ESQUIRE*.—This sentiment is confirmed by Pasquier, who supposes the appellation *gentiles* and *esquiers* to have been transmitted to us from the Roman soldiery; it being to the *gentiles* and *scutarii*, who were the bravest of the soldiery, that the principal benefices and portions of lands were assigned. See *BENEFICE*.—The Gauls observing, that, during the empire of the Romans, the *scutarii* and *gentiles* had the best tenements or appointments of all the soldiers on the frontiers of the provinces, became insensibly accustomed to apply the same names, *gentilhomme*s and *esquiers*, to such as they found their kings gave the best provisions or appointments to.

GENTLEMAN-UsHER of the Black Rod. See *ROD*.

GENTLEMEN of the Chapel; officers whose duty and attendance is in the royal chapel, being in number thirty-two. Twelve of them are priests; the other twenty, commonly called *clerks of the chapel*, assist in the performance of divine service. One of the first twelve is chosen for confessor of the household; whose office it is to read prayers every morning to the household servants, to visit the sick, examine and prepare communicants, and administer the sacrament. One of twenty clerks, well versed in music, is chosen first organist, who is master of the children, to instruct them in music, and whatever else is necessary for the service of the chapel; a second is likewise an organist; a third, a lutanist; and a fourth, a violist. There are likewise three vergers, so called from the silver rods they carry in their hands; being a serjeant, a yeoman, and groom of the vestry: the first attends the dean and sub-dean, and finds surplices and other necessaries for the chapel; the second has the whole care of the chapel, keeps the pews, and seats the nobility and gentry; the groom has his attendance within the chapel-door, and looks after it.

GENUS, among metaphysicians and logicians, denotes a number of beings which agree in certain general properties common to them all: so that a genus is nothing else but an abstract idea, expressed by some general name or term. See *LOGIC*, n° 18, &c.

It is plain, therefore, that by a genus we do not barely signify one particular thing, nor yet a plurality of things; but a sort or kind of things, all agreeing in certain general properties.

Thus animal is said to be a genus in respect of man and brute, in regard man and brute agree in the common nature and character of animal: so a right-lined figure of four sides, is a genus in respect of a parallelogram and a trapezium; and so likewise is substance, in respect of subistence extended, which is body, and thinking substance, which is mind.

The method by which the mind advances to form genera

Gentile
Genus

* See
Commonalty

Genus. genera is, according to Mr Locke, as follows.—Observing several things, that differ from the mind's idea of man, for instance, and therefore cannot be comprehended under that name, to agree with man in some certain qualities; by retaining only those qualities, and uniting them into one idea, it gets another more general idea, to which giving a name, it makes a new genus, or a term of a more comprehensive extension. Thus, by leaving out the shape, and other properties signified by the word *man*, and retaining only a body with life, sense, and spontaneous motion, we form the idea signified by the name *animal*. By the same way the mind proceeds to body, substance, and at last to being, thing, and such universal terms as stand for any ideas whatever.

This shews the reason why, in defining things, we make use of the genus, namely, to save the labour of enumerating the several simple ideas which the next term stands for: from whence it appears, that genus is no more than an abstract idea, comprehending a greater or less number of species, or more particular classes. See SPECIES.

GENUS is also used for a character or manner applicable to every thing of a certain nature or condition: in which sense it serves to make capital divisions in divers sciences, as rhetoric, anatomy, and natural history.

GENUS, in rhetoric. Authors distinguish the art of rhetoric, as also orations or discourses produced thereby, into three genera or kinds, demonstrative, deliberative, and judiciary. To the demonstrative kind belong panegyrics, genethliacons, epithalamiums, funeral harangues, &c. To the deliberative kind belong persuasions, dissuasions, commendations, &c. To the judiciary kind belong defences and accusations.

GENUS, in natural history, a subdivision of any class or order of natural beings, whether of the animal, vegetable, or mineral kingdoms, all agreeing in certain common characters. See BOTANY and ZOOLOGY.

GENUS, in music, by the ancients called *genus melodice*, is a certain manner of dividing and subdividing the principles of melody; that is, the consonant and dissonant intervals, into their concinnous parts.

The moderns considering the octave as the most perfect of intervals, and that whereon all the concords depend, in the present theory of music, the division of that interval is considered as containing the true division of the whole scale.

But the ancients went to work somewhat differently: the diatessaron, or fourth, was the least interval which they admitted as concord; and therefore they sought first how that might be most conveniently divided; from whence they constituted the diapente and diapacon.

The diatessaron being thus, as it were, the root and foundation of the scale, what they called the genera,

or kinds, arose from its various divisions; and hence they defined the *genus modulandi* to be the manner of dividing the tetrachord and disposing its four sounds as to succession.

The genera of music were three, the enharmonic, chromatic, and diatonic. The two first were variously subdivided: and even the last, tho' that is commonly reckoned to be without any species; yet different authors have proposed different divisions under that name, without giving any particular names to the species, as was done to the other two.

For the characters, &c. of these several genera, see ENHARMONIC, CHROMATIC, and DIATONIC.

GEOCENTRIC, in astronomy, is applied to a planet, or its orbit, to denote it concentric with the earth, or as having the earth for its centre, or the same centre with the earth.

GEOFFREY of MONMOUTH, bishop of St Asaph, called by our ancient biographers *Gallofridus Monmouthensis*. Leland conjectures that he was educated in a Benedictine convent at Monmouth, where he was born; and that he became a monk of that order. Bale, and after him Pits, call him archdeacon of Monmouth; and it is generally asserted that he was made bishop of St Asaph in the year 1151 or 1152, in the reign of king Stephen. His history was probably finished after the year 1138. It contains a fabulous account of British kings, from the Trojan Brutus, to the reign of Cadwallader in the year 690. But Geoffrey, whatsoever censure he may deserve for his credulity, was not the inventor of the stories he relates. It is a translation from a manuscript written in the British language, and brought to England from Armorica by his friend Gualter, archdeacon of Oxford. But the achievements of king Arthur, Merlin's prophecies, many speeches and letters, were chiefly his own addition. In excuse for this historian, Mr Wharton judiciously observes, that fabulous histories were then the fashion, and popular traditions a recommendation to his book.

GEOFFROY (STEPHEN FRANCIS), a celebrated physician, botanist, and chemist, born at Paris in 1672. After having finished his studies, he travelled into England, Holland, and Italy. In 1704, he received the degree of doctor of physic at Paris; and at length became professor of chemistry, and physician of the Royal College. He was a member of the Royal Society of London, and of the Academy of Sciences. He wrote, 1. Several very curious Theses in Latin, which were afterwards translated into French. 2. An excellent treatise, intitled *Traictatus de Materia Medica, sive de Medicamentorum simplicium, historia, virtute, defectu, & usu*. He died at Paris, in 1731.

GEOGRAPHICAL MILE, the same with the sea-mile; being one minute, or the 60th part of a degree of a great circle on the earth's surface.

G E O G R A P H Y.

GEOGRAPHY (*γραφικα*, from *γη terra*, and *γραφω scribo*); the doctrine or knowledge of the earth, both as in itself, and as to its affections; or a

description of the terrestrial globe, and particularly of the known and inhabitable parts thereof, with all its different divisions.

SECT.

Geocentric
Geography.

SECT. I. *History of the Science.*

At what time the science of geography began first to be studied among mankind is entirely uncertain. It is generally agreed, that the knowledge of it was derived to the Greeks, who first of the European nations cultivated this science, from the Egyptians or Babylonians; but it is impossible to determine which of these two nations had the honour of the invention. Herodotus tells us, that the Greeks first learned the pole, the gnomon, and the twelve divisions of the day, from the Babylonians. By Pliny, and Diogenes Laertius, however, we are told, that Thales of Miletus first found out the passage of the sun from tropic to tropic; which he could not have done without the assistance of a gnomon. He is said to have been the author of two books, the one on the tropic, and the other on the equinox; both of which he probably determined by the gnomon; and by this he was led to the discovery of the four seasons of the year, which are determined by the solstices and equinoxes.

Thales divided the year into 365 days; which was undoubtedly a method discovered by the Egyptians, and communicated by them to him. It is said to have been invented by the second Mercury, surnamed Trismegistus, who, according to Eusebius, lived about 50 years after the *Exodus*. Pliny tells us expressly, that this discovery was made by observing when the *shadow returned to its marks*; a clear proof that it was done by the gnomon. Thales also knew the method of determining the height of bodies by the length of their shadows, as appears by his proposing this method for measuring the height of the Egyptian pyramids. Hence many learned men have been of opinion, that as the use of the gnomon was known in Egypt long before the dawn of learning in Greece, the pyramids and obelisks, which to common travellers appeared only to be buildings of magnificence, were in reality as many sun-dials on a very large scale, and built with a design to ascertain the season of the year, by the variation of the length of their shadows; and, in confirmation of this opinion, it was found by M. Chazelles in 1694, that the two sides, both of the larger and smaller pyramids, stood exactly north and south; so that, even at this day, they form true meridian lines.

From the days of Thales, who flourished in the fifth century before Christ, very little seems to have been done towards the establishment of geography for 200 years. During this period, there is only one astronomical observation recorded; namely, that of Meton and Euctemon, who observed the summer solstice at Athens, during the archonship of Apseudes, on the 21st of the Egyptian month Phamenoth, in the morning, being the 27th of June, 432. B. C. This observation was made by watching narrowly the shadow of the gnomon, and was done with a design to fix the beginning of their cycle of 19 years.

Timocharis and Ariftillus, who began to observe about 295 B. C. seem to have been the first who attempted to fix the longitudes and latitudes of the fixed stars, by considering their distances from the equator. One of their observations gave rise to the discovery of the precession of the equinoxes, which was

first observed by Hipparchus about 150 years after; and he made use of Timocharis and Ariftillus's method, in order to delineate the parallels of latitude, and the meridians on the surface of the earth; thus laying the foundation of the science of geography as we have it at present.

But though the latitudes and longitudes were thus introduced by Hipparchus, they were not attended to by any of the intermediate astronomers, till the days of Ptolemy. Strabo, Vitruvius, and Pliny, have all of them entered into a minute geographical description of the situation of places, according to the length of the shadows of the gnomon, without taking the least notice of the degrees and minutes of longitude and latitude.

The discovery of the longitudes and latitudes immediately laid a foundation for making maps, or delineations of the surface of the earth *in plano*, on a very different plan from what had been attempted before. Formerly the maps were little more than rude outlines and topographical sketches of different countries. The earliest were those of Scythia, mentioned by Eustathius; who says, that "this Egyptian king, having traversed great part of the earth, recorded his march in maps, and gave copies of his maps not only to the Egyptians, but to the Scythians, to their great astonishment.—Some have imagined, that the Jews made a map of the Holy Land, when they gave the different portions to the nine tribes at Shiloh: for Joshua tells us, that they were sent to walk through the land, and that they *described it in seven parts in a book*; and Josephus tells us, that when Joshua sent out people from the different tribes to measure the land, he gave them, as companions, persons well skilled in geometry, who could not be mistaken in the truth.

The first Grecian map on record is that of Anaximander, mentioned by Strabo, lib. i. p. 7. It has been conjectured by some, that this was a general map of the then known world, and is imagined to be the one referred to by Hipparchus under the designation of the *ancient map*. Herodotus minutely describes a map made by Ariftagoras tyrant of Miletus, which will serve to give us some idea of the maps of those ages. He tells us, that Ariftagoras shewed it to Cleomenes king of Sparta, with a view of inducing him to attack the king of Persia, even in his palace at Susa, in order to restore the Ionians to their ancient liberty. It was traced upon brass or copper, and contained the intermediate countries which were to be traversed in that march. Herodotus tells us, that it contained "the whole circumference of the earth, the whole sea, or ocean, and all the rivers;" but these words must not be understood literally. From the state of geography at that time, it may be fairly concluded that by the *sea* was meant no more than the Mediterranean; and therefore, the earth or land signified the coasts of that sea, and more particularly the Lesser Asia, extending towards the middle of Persia. The rivers were the Hays, the Euphrates, and Tigris, which Herodotus mentions as necessary to be crossed in that expedition. It contained one straight line, called the *Royal Highway*, which took in all the stations or places of encampment from Sardis to Susa. Of these there were 111 in the whole journey, containing

1
Seasons of
the year discovered by
Thales.

2
Conjecture concerning
the use of the Egyptian
pyramids and obelisks.

3
Longitudes and latitudes determined.

4
Account of the ancient maps.

HISTORY. taining 13,500 stadia, or 1687 $\frac{1}{2}$ Roman miles of 5000 feet each.

These itinerary maps of the places of encampment were indispensably necessary in all armies. Athenæus quotes Baxton as author of a work intitled, *The encampments of Alexander's march*; and likewise Amyntas to the same purpose. Pliny tells us, that Diogenes and Bæton were the surveyors of Alexander's marches, and then quotes the exact number of miles according to their mensuration; which he afterwards confirms by the letters of Alexander himself. It likewise appears, that Alexander was very careful in examining the measures of his surveyors, and took care to employ the most skilful in every country for this purpose. The same author also acquaints us, that a copy of this great monarch's surveys, was given by Xenocles his treasurer, to Patrocles the geographer, who, as Pliny informs us, was admiral of the fleets of Seleucus and Antiochus. His book on geography is often quoted both by Strabo and Pliny; and it appears, that this author furnished Eratosthenes with the principal materials for constructing his map of the oriental part of the world.

Parallel of latitude how drawn at first.

Eratosthenes was the first who attempted to reduce geography to a regular system, and introduced a regular parallel of latitude. This was traced over certain places where the longest day was of the same length. He began it from the straits of Gibraltar; and it thence passed through the Sicilian sea, and near the southern extremities of Peloponnesus. From thence it was continued through the Island of Rhodes and the Bay of Issus; and there entering Cilicia, and crossing the rivers Euphrates and Tigris, it was extended to the mountains of India. By means of this line, he endeavoured to rectify the errors of the ancient map, supposed to be that of Anaximander. In drawing this parallel, he was regulated by observing where the longest day was fourteen hours and an half, which Hipparchus afterwards determined to be the latitude of 36 degrees.

Attempts to determine the extent of the earth's circumference.

The first parallel through Rhodes was ever afterwards considered with a degree of preference, like the foundation-stone of all ancient maps; and the longitude of the then known world was often attempted to be measured in stadia and miles, according to the extent of that line, by many succeeding geographers. Eratosthenes soon after attempted, not only to draw other parallels of latitude, but also to trace a meridian, at right angles to these, passing through Rhodes and Alexandria, down to Syene and Meroë; and as the progress he thus made tended naturally to enlarge his ideas, he at last undertook a still more arduous task, namely, to determine the circumference of the globe, by an actual measurement of a segment of one of its great circles. Here he made his computation by uniting certain accurate observations made in the heavens, with a corresponding distance carefully surveyed and taken upon a meridian of the earth. The segment of the meridian which he pitched upon for this purpose, was that between Alexandria and Syene, the distance betwixt which places was found to be 5000 stadia. The angle of the shadow on the sun-dial of Alexandria was equal to the 50th part of the circle; but at Syene there was no shadow on the day of the summer solstice; and that this might be the more accurately

observed, they dug a deep well, which being perpendicular, was completely illuminated at the bottom when the sun was vertical. Even this, however, was not sufficient to give the exact line of the tropic; because the sun was found to be vertical, or to cast no shadow at all, for a circular space of 300 stadia. The reason of this is, that the apparent diameter of the sun is 32 minutes, and he must therefore appear perpendicular to an extent of ground equivalent to that space.

The investigation of this problem of the circumference of the earth was essentially necessary for determining the radical principles of all maps; and therefore the most eminent of the ancient geographers made repeated attempts to discover this exactly. Eratosthenes made the circumference 250,000 or 252,000 stadia; thus allowing 700 stadia, or 87 $\frac{1}{2}$ Roman miles, to each degree. Hipparchus added 25,000 stadia to this measurement of Eratosthenes, which increased the degree to 96 Roman miles. Ptolemy, however, having obtained a more accurate measurement than that of Eratosthenes, reduced the circumference of the earth to 180,000 stadia, and the degree to 62 $\frac{1}{2}$ Roman miles.

The map of Eratosthenes, though the best of which antiquity can boast, was nevertheless exceedingly imperfect and inaccurate. It contained little more than the states of Greece, and the dominions of the successors of Alexander, digested according to the surveys above-mentioned. He had seen, indeed, and has quoted, the voyages of Pytheas into the great Atlantic ocean, which gave him some faint idea of the western parts of Europe; but so imperfect, that they could not be realised into the outlines of a chart. Strabo tells us, that he was extremely ignorant of Gaul, Spain, Germany, and Britain. He was equally ignorant of Italy, the coasts of the Adriatic, Pontus, and all the countries towards the north. We are also told by the same author, that Eratosthenes made the distance between Epidamnus or Dyrrhachium on the Adriatic, and the bay of Thermæ on the Ægean sea, to be only 900 stadia, when in reality it was above 2000; and in another instance, he had enlarged the distance from Carthage to Alexandria to 15,000 stadia, when in reality it was no more than 9000.

Such was the state of geography and the nature of the maps prior to the time of Hipparchus; who, as already observed, made a closer connection between geography and astronomy, by determining the longitudes and latitudes from celestial observations. It must be owned, however, that the previous steps to this new projection of the sphere had been in a great measure made easy by Archimedes, upwards of 50 years before the time of Hipparchus, when he invented his noble theorems for measuring the surface of a sphere and its different segments.

It appears that war has been generally the occasion of making the most accurate maps of different countries; and therefore geography made great advances from the progress of the Roman arms. In all the provinces occupied by that people, we find that camps were every where constructed at proper intervals, and roads were raised with substantial materials, for making an easier communication between them; and thus civilisation and surveying were carried on according to system throughout the extent of that large empire.

Inaccuracy of the ancient maps.

HISTORY. Every new war produced a new survey and itinerary of the countries where the scenes of action passed; so that the materials of geography were accumulated by every additional conquest. Polybius tells us, that at the beginning of the second Punic war, when Hannibal was preparing his expedition against Rome, the countries through which he was to pass, were carefully measured by the Romans. Julius Cæsar caused a general survey of the Roman empire to be made, by a decree of the senate. Three surveyors, Zenodorus, Theodotus, and Polyclitus, had this task assigned them, and are said to have completed it in 25 years. The Roman itineraries that are still extant, also shew what care and pains they had been at in making surveys in all the different provinces of their empire; and Pliny has filled the third, fourth, and fifth books of his Natural History with the geographical distances that were thus measured. We have likewise another set of maps still preserved to us, known by the name of the *Peutingerian Tables*, published by Welfer and Bertius, which give a sufficient specimen of what Vegetius calls the *Itinera Picta*, for the clearer direction of their armies in their march.

The Roman empire had been enlarged to its greatest extent, and all its provinces well known and surveyed, when Ptolemy, in the reign of Antoninus Pius, about 150 years after Christ, composed his system of geography. The principal materials he made use of for composing this work, were the *proportions of the gnomon to its shadow*, taken by different astronomers at the times of the equinoxes and solstices; calculations founded upon the length of the longest days; the measures or computed distances of the principal roads contained in their surveys and itineraries; and the various reports of travellers and navigators, who often determined the distances of places by hearsay and conjecture. All these were compared together, and digested into one uniform body or system; and afterwards were translated by him into a new mathematical language, expressing the different degrees of longitude and latitude, according to the invention of Hipparchus, but which Ptolemy had the merit of carrying into full practice and execution, after it had been neglected for upwards of 250 years. With such imperfect and inaccurate materials, it is no wonder to find many errors in Ptolemy's system. Neither were these errors such as had been introduced in the more distant extremities of his maps, but even in the very centre of that part of the world which was the best known to the ancient Greeks and Romans, and where all the famed ancient astronomers had made their observations.—Yet this system, with all its imperfections, continued in vogue till the beginning of the present century. The improvements in geography which at that time, and since have taken place, were owing to the great progress made in astronomy by several eminent men who lived during that period. More correct methods and instruments for observing the latitude were found out, and the discovery of Jupiter's satellites afforded a much easier method of finding the longitudes than was formerly known. The voyages made by different nations also, which were now become much more frequent than formerly, brought to the knowledge of the Europeans a vast number of countries utterly unknown to them before. The late voyages of Captain

Cooke, made by order of his Britannic Majesty, have contributed more to the improvement of geography than any thing that has been done during the present century; so that now the geography of the utmost extremities of the earth is in a fair way of being much better known to the moderns, than that of the most adjacent countries was to the ancients. This, however, must be understood only of the sea-coasts of these countries; for, as to their internal geography, it is less known now than before, except in a very few places.

On the whole, it may be observed, that geography is a science even yet far from perfection. The maps of America and the eastern parts of Asia are, perhaps, more unfinished than any of the rest. Even the maps of Great Britain and Ireland are very imperfect and unsatisfactory; and the numbers we have of them, varied, and republished, without any real improvement, justly confirm an observation made by Lord Bacon, namely, that an opinion of plenty is one of the causes of want. The late Dr Bradley was of opinion, that there were but two places in England whose longitude might be depended upon as accurately taken; and that these were the observatory at Greenwich, and Serburn-castle the seat of the Earl of Macclesfield in Oxfordshire; and that their distance was one degree in space, or four minutes in time. Even this was found to be inaccurate, the distance in time being observed by the late transit of Venus to be only three minutes and forty-seven seconds. It were well, however, if there were no greater errors with regard to other places: but if we examine the longitude of the Lizard, we shall find scarce any two geographers that agree concerning it; some making it $4^{\circ} 40'$ from London; others 5° , and $5^{\circ} 14'$; while some enlarge it to 6° . Our best maps are therefore still to be considered as unfinished works, where there will always be many things to be added and corrected, as different people have an opportunity.

SECT. II. Principles and Practice of Geography.

THE practical part of geography consists in measuring the distances between different places on the surface of the earth, and laying them down upon paper according to their different longitudes and latitudes. For this purpose, an exact observation of the longitudes and latitudes of the different places is sufficient; for when once these are known, the distance between the places themselves is easily found, that is to say, provided the extent of the circumference of the earth is known; for without this, it is impossible to ascertain the distance between any two places except by actual mensuration. For the solution of this problem, it is only necessary to measure one degree of the earth's surface; which may be done in the following manner. Having found exactly the latitude of the place from whence your mensuration is to commence, by the directions given under ASTRONOMY, n^o 209. proceed exactly northward or southward, carefully measuring the distance as you go along, till you find by another celestial observation that you are got to one degree of latitude either farther north or farther south than the place from whence you set out. The distance between the two places is the length of a degree on the earth's surface; and consequently, if multiplied by 360, will give the measure of the whole circumference of the earth.

Geography still imperfect.

How to measure a degree of the earth's surface.

This.

This method, however, though in theory it seems to be so easy and simple, is nevertheless attended with very great, nay, almost insurmountable, difficulties in practice. It is impossible to find a perfect plane on the surface of the earth, which extends for so great a length. In the mensuration of a degree, therefore, the inequalities with which the earth every where abounds are found to be exceeding great obstacles. For this reason, we are obliged to have recourse to trigonometrical calculations of the distances between different places, till we arrive at one distant from that whence we set out by a degree of latitude. But it is impossible to make any calculation in the trigonometrical way without some small error; nay, often not without a very great one; for the different states of the atmosphere are found greatly to affect trigonometrical mensurations. Hence there hath arisen a prodigious disagreement among those who have attempted to measure the circumference of the terraqueous globe; for as a degree of the earth's surface cannot be measured but by many calculations, the error in one being repeated in all the rest must necessarily become very considerable at last. Those who first attempted this mensuration, computed the circumference of the earth to be 50,000 Italian miles; by Ptolemy it was reckoned only 21,600 of the same miles; and the more modern geometers have computed the circumference of the earth at about 25,000 miles.

A method more easily practicable would seem to be by attempting to measure the degrees of longitude. We know, that at the equator a degree of longitude is equal to a degree of latitude; but as we advance towards either of the poles, the degrees of longitude continually decrease by reason of the approximation of the meridians to each other, till at the pole itself they totally vanish. If we know the length of a degree of longitude at the equator, therefore, we can easily, by a geometrical calculation liable to no unavoidable error, find the length of a degree of longitude at any distance either north or south from the equator. Again, if we know the measure of a degree of longitude at any distance from the equator, we may easily, by a like calculation, find the length of a degree of longitude at the equator itself. If, therefore, attempts are made to measure the degrees of longitude at the equator itself, and in many different places north and south from it, making at the same time proper geometrical calculations, it is plain that all these different operations will tend to confirm or correct one another, and by their mutual agreement or disagreement among themselves we will know which of them comes nearest the truth.

As a difference in longitude makes also a difference in the hour of the day, we have from thence a much easier method of measuring a degree of longitude than of measuring one of latitude. We know, that if two places are distant from each other by 15 degrees of longitude, it will be one o'clock in the afternoon in the one, when it is only twelve o'clock in the other. If they are distant from each other by a single degree of longitude, it will be four minutes after twelve at the one, when it is exactly twelve at the other. If they are distant half a degree, the difference will be two minutes; or if a quarter of a degree, the difference in time will be one minute. Instruments for

computing time, are now brought to such a degree of perfection, that if two of them are exactly set with each other, they may be safely trusted for a much longer time than what is necessary for the operation we now speak of. Having therefore chosen our first station, and drawn there a meridian line as directed at ASTRONOMY, n^o 174, 175. we must observe exactly when the sun is in the meridian, and then set our time-piece to twelve o'clock. We must then proceed directly eastward or westward a considerable way, till we arrive at some other convenient station; and having there also drawn a meridian line, we are to observe exactly by it when the sun comes to the meridian, and looking upon our time-piece at the same time, we will know how much the one place differs from the other in longitude by the distance of time shewn by the time-piece either before or after twelve, when the sun is exactly in the meridian of the second station.

The advantages which this method hath over the other, arise from the exactness with which the instrument is supposed to measure time, and from there being a less space on the surface of the earth to be measured than in the other. A minute, or even half a minute of time, may be observed by a proper instrument very exactly; and one of Mr Harrison's time-pieces may undoubtedly be trusted as perfectly exact for two or three days. If we attempt the mensuration of a degree of longitude at the equator, we must choose out second station at a considerable distance before we can expect a variation in time great enough to be observed with any tolerable accuracy: thus before a difference of one minute at the equator could be perceived, we must travel more than 17 English miles eastward or westward; but in the latitude of 60 degrees we would only have half that space to travel, and therefore could measure it with more exactness; at the latitude of 70 degrees, little more than a third of that space would require to be measured; and at 80 degrees, scarce an eighth part. The extreme cold in these high latitudes, however, renders it almost impossible to penetrate so far; though the voyage of the Hon. Constantine Phipps afforded a very favourable opportunity for a mensuration of this kind, and several as favourable opportunities as could be wished occurred in the voyages of captain Cook, had such a thing been thought of. Yet it is not to be expected that the extent of the earth's circumference will ever be known with great accuracy, though we are certainly not yet arrived at the nearest approximation to truth which is attainable on this subject.

Hitherto we have supposed the circumference of the earth to be exactly circular, or the globe itself to be a perfect sphere; but, from some observations, this appears not to be the case. Some time ago, the French made an observation, shewing that a pendulum vibrates slower in proportion as it is brought nearer to the equator: that is, the gravity or celerity of descent of the pendulum, and of all other bodies, is less in countries approaching to the equator than in places near either pole. This excited the curiosity of the celebrated philosophers Huygens and Newton, who thence conjectured that the earth must have some other figure than what was commonly supposed. Sir Isaac Newton afterwards demonstrated that this diminution of weight naturally arises from the earth's rotation

10
Earth not
an exact
sphere.

PRINCIPLES
and
PRACTICE

* See Earth,
nº 28.

Of finding
the longi-
tudes and
latitudes.

Of the dif-
ferent kinds
of maps.

PRINCIPLES
and
PRACTICE

Ortho-
graphic pro-
jection.

round its axis; which, according to the laws of circular motion, repels all heavy bodies from the axis of motion: so that this motion, being swifter at the equator than in parts more remote, the weight of bodies must also be much less there than nearer the poles *. —To determine this matter, several mathematicians were by the French king employed to measure a degree on the earth's surface in different parts of the world; and, according to their mensurations, the diameter of the earth from north to south is shorter than that from east to west, by 36 miles.

With regard to the method of finding the longitudes and latitudes of particular places, rules have been already laid down under *ASTRONOMY*, nº 209. and 282, 283. The same thing, however, may be done by other methods. Thus, the latitude may be found by observing exactly the meridian altitude of the sun, and knowing his declination for that day, the declination subtracted from the meridian altitude gives the complement of the latitude, and this last subtracted from 90° leaves the latitude required. As to the longitude, Mr Harrison, by his invention of time-pieces which go much more exactly than either clocks or watches could be made to do formerly, hath in a great measure facilitated that. For, supposing any person, possessed of one of these time-pieces, to set out on a journey, *ex g.* from London. If he adjusts his time-piece properly before he goes away, he will know the hour at London exactly, let him go where he pleases; and when he hath proceeded so far either eastward or westward, that a difference is perceived betwixt the hours shown by his time-piece, and those on the clocks or watches at the place to which he goes, the distance of that place from London in degrees and minutes of longitude will be known; and if the length of a degree of longitude is known, the real distance between the two places may also be easily found. It is not to be expected, however, that any instrument, with whatever care it may be constructed, can always be depended upon as an exact measurer of time; and therefore frequent corrections of longitudes taken in this manner will be necessary. The method of finding the longitude from the eclipses of Jupiter's satellites appears to be the best of any. Eclipses of the sun, and occultations of the stars by the moon, are also very proper, though they happen but seldom. Eclipses of the moon have also been made use of for this purpose; but it is found impossible to observe either the beginning or end of a lunar eclipse with the accuracy necessary for determining the longitude of any place. —All these different methods agree in this, that they determine the longitude by the difference of time between the observation of the phenomenon in two different places; and of this time, four minutes are to be allowed for every degree of longitude either east or west.

After the geographer is thus become acquainted with the longitudes and latitudes of a great number of different places, he may delineate them upon paper, or make a *map*, either of the whole world, or of any particular country with which he is best acquainted. General maps of the world, or of very large tracts, answer the purpose of shewing in what manner the different countries of the world lie with respect to each other. They cannot be made of such a size as to admit

the delineation of many particular towns or cities, neither indeed is it at all required. Where the whole world is delineated at once, the mind can hardly take in more than the idea of the situations of different kingdoms from one another; the situations of the different cities of each particular kingdom being almost wholly overlooked, and not attended to: and this happens likewise where a very large portion of the globe, as one of the four quarters, is represented on a single map. Besides these, therefore, it is necessary to have particular maps of all the different countries done upon a larger scale, that thus the mind may not be fatigued by endeavouring to comprehend too much at once. The qualifications which maps ought to have, in order to render them complete, are, 1. That they represent the countries exactly of the same shape, and in the same proportions to the eye, that they really have on the earth itself. 2. That the divisions of one country from another be distinctly marked, and readily perceptible, without a disagreeable and tedious search. 3. That the longitudes and latitudes of different places be found exactly on the map, and with little or no trouble.

The foundation of all maps is what is called the *projection of the sphere*, i. e. the delineation of those circles apparently traced out by the sun in the heavens, upon some substance, either plane or spherical, designed to represent the surface of the earth; upon which also are delineated the parallels of latitude, and the meridians, in as great numbers as the size of the map will admit of without confusion.

These delineations upon a spherical surface are very easy: and under the article *GLOBE*, full directions are given for the construction of the spherical substances upon which maps of the earth and the heavens are usually delineated; and which, when furnished with the rest of their apparatus, are called *terrestrial* and *celestial globes*. The method of drawing the maps for these globes, is never followed in any other case; for which reason it is also referred to the article *GLOBE*. The ordinary kinds of maps are constructed by delineating the circles of the sphere upon a plane surface, according to the rules of perspective. This is properly the projection of the sphere; and is designed to give a view of the terraqueous globe, as it would appear, at some distance, to an eye that could take in the whole extent of it at once.

§. 1. Of Projections of the Sphere, and Maps.

Of projections there are two kinds, the *orthographic* and *stereographic*; both of which represent the surface of the earth projected upon the plane of one of its great circles.

1. The *orthographic* supposes the eye to be placed at an infinite distance in the axis of the circle of projection, while the second supposes it to be only in the pole of that circle. The circles on which the projections are usually made, are, the equator, some of the meridians, or the rational horizon of some particular place. For maps of the world, a meridian is generally chosen; and most commonly that one which passes through Ferro, one of the Canary Islands, because thus the continents of Europe, Asia, and Africa, are conveniently delineated in one circle, and America in the other.

GEOGRAPHY.

2^d Plan: CXV.

Fig. 1.



Fig. 2.



Fig. 3.



Fig. 3.



Fig. 4.



Fig. 6.



A. Bell sculp.

PRINCIPLES
and
PRACTICE

PRINCIPLES
and
PRACTICE

14
On the
plane of
a meridian.
2d Plate
CXV.

1. To project the sphere orthographically on the plane of any meridian, we have only to consider, that as the eye is supposed to be at an infinite distance, all the rays which come from the disk of the earth are parallel; and consequently all lines drawn from the eye to the disk must be perpendicular to the latter. Let, therefore, $ABCD$, (fig. 1.) represent the plane of one of the meridians. The equator, which cuts all the meridians in the middle, must be represented by an infinite number of points let fall upon the plane of projection, and dividing it exactly in the middle; that is, by the right line BD . The parallels of latitude, being also perpendicular to the plane of the meridian, will be marked out by an infinite number of right lines let fall from their peripheries upon that plane, thus forming the right lines ab , cd , &c. The meridians will likewise be represented on the disk by an infinite number of right lines let fall perpendicularly from their peripheries upon the plane of projection, and thus will form the elliptic curves $AtoC$ $AzoC$, &c. From an inspection of the figure, therefore, it appears, that in this projection both longitudes and latitudes are measured by a line of sines, and both of them decrease prodigiously as we approach the edges of the disk; and hence the countries which lie at a distance from the equator are exceedingly distorted, and it is even impossible to draw them with any degree of accuracy. The orthographic projection on the plane of a meridian, therefore, is never used for a map of the world.

15
On the
equator,
fig. 2.

2. On the plane of the equator, the orthographic projection represents the meridians as straight lines diverging from a centre, and the parallels of latitude as concentric circles. The latter, however, are by no means to be placed at equal distances from each other; for the meridians are to be divided by the line of sines, as in the last; and thus the equatorial parts of the globe are as much distorted and confused as the polar ones were in the foregoing. This projection, therefore, is seldom used for a map of the whole world, though it answers very well for a representation of the polar regions.

16
On any
particular
horizon,
fig. 3.

3. On the horizon of any particular place, except either of the poles, or any point lying directly under the equator, the orthographic projection represents both parallels and meridians by segments of ellipses. The figure shews a map done on the horizon of Ur of the Chaldees: it is obvious, however, that a considerable degree of distortion takes place here also; though less than in the former cases. Projections of this kind, therefore, are used only for the construction of solar eclipses. See *ASTRONOMY*, n° 269.

17
Stereographic
projection.

II. The *stereographic* projection of the sphere supposes the eye to be in the pole of the circle of projection. The laws of this projection are,

1. A right circle is projected into a line of half tangents.

2. The representation of a right circle, perpendicularly opposed to the eye, will be a circle in the plane of the projection.

3. The representation of a circle placed oblique to the eye, will be a circle in the plane of the projection.

4. If a great circle is to be projected upon the plane of another great circle, its centre will lie in the

line of measures, distant from the centre of the primitive by the tangent of its elevation above the plane of the primitive.

5. If a lesser circle, whose poles lie in the plane of the projection, were to be projected; the centre of its representation would be in the line of measures, distant from the centre of the primitive, by the secant of the lesser circles distance from its pole, and its semi-diameter or radius be equal to the tangent of that distance.

6. If a lesser circle were to be projected, whose poles lie not in the plane of the projection, its diameter in the projection, if it falls on each side of the pole of the primitive, will be equal to the sum of the half tangents of its greatest and nearest distance from the pole of the primitive, set each way from the centre of the primitive in the line of measures.

7. If the lesser circle to be projected fall entirely on one side of the pole of the projection, and do not encompass it: then will its diameter be equal to the difference of the half tangents of its greatest and nearest distance from the pole of the primitive; set off from the centre of the primitive one; and the same way in the line of measures.

8. In the stereographic projection, the angles made by the circles of the surface of the sphere, are equal to the angles made by their representatives in the plane of their projection.

For a demonstration of these laws, see the articles *PERSPECTIVE* and *PROJECTION*. The method of delineating general maps of the world will, however, be easily understood by the following directions.

19
On the
plane of a
meridian,
fig. 6.

1. To delineate a map of the earth upon the plane of a meridian. Draw a circle of any convenient magnitude, as $ABCD$, to represent one half of the earth's disc; draw two diameters AB , CD , intersecting each other at right angles; AB will then represent the equator, and CD that meridian which is directly perpendicular to the plane of projection, C will be the north pole, and D the south pole. Divide the circle into 360 equal parts, representing the degrees of latitude; or into smaller parts, if it can admit of such a division, to represent minutes. Then, by means of a sector, divide the equator AB into two lines of semitangents EA and EB , which will represent the degrees of longitude. Then with the secant of 80° , as a radius describe the arch of the circle Ced , which represents a meridian cutting the plane of projection at an angle of 80° ; with the secant of 70° , describe the arch CaD , which represents a meridian cutting the plane of projection at 70° ; and thus proceed with the rest of the meridians, which are usually drawn at every ten degrees longitude, as the parallels are at every ten degrees latitude. These last are to be drawn with the tangents for radii as the meridians are with the secants; GH , representing the parallel of ten degrees, with the tangent of 80° , that of 20 with the tangent of 70° , &c. The elliptic AQB is drawn with the tangent of 66.31 for a radius, its greatest distance from the equator being 23. 29. This is the most common projection for maps of the world, and is that on which the map Plate CXVI. is delineated. It hath this disadvantage, however, that neither the degrees of longitude nor latitude continue of the same length, even under the same parallel; and consequently the shape of the countries

tries is somewhat distorted: it is also exceedingly difficult to find the precise degree of longitude or latitude belonging to any place, upon maps of this kind, as must be evident from an inspection of the figures.

2. On the plane of the horizon. Suppose, for instance, it is desired to have London the centre of the map: its latitude we will suppose to be 51 degrees 32 minutes. Take then the point E (fig. 5.) for London; and from this, as a centre, describe the circle ABCD to represent the horizon; which you are then to divide into four quadrants, and each of these into 90 degrees. Let the diameter BD be the meridian, B the northern quarter, D the southern; the line of equinoctial east and west shews the first vertical, A the west, C the east, or a place of 90 degrees from the zenith in the first vertical. All the verticals are represented by right lines drawn from the centre E to the several degrees of the horizon. Divide BD into 180 degrees, as in the former method; the point in EB, representing 51 deg. 32 min. of the arch B C, will be the projection of the north pole, which note with the letter P. The point in ED representing 51 deg. 32 min. of the arch DC, (reckoning from C towards D), will be the projection of the intersection of the equator and meridian of London; and from this, towards P, write the numbers of the degrees, 1, 2, 3, &c. As also towards D, and from B towards P, viz. 51, 52, 53, &c.

Then taking the corresponding points of equal degrees, 88, 89, &c. about those, as diameters, describe circles, which will represent parallels, or circles of latitude, with the equator, tropics, and polar circles. For the meridians, first describe a circle through the three points A, P, C. This will represent the meridian 90 degrees from London. Let its centre be M in BD, (continued to the point N, which represents the south pole), PN being the diameter, through M draw a parallel to A C, viz. FH, continued each way to K and L. Divide the circle PHNF into 360 degrees; and from the point P draw right lines to the several degrees, cutting KFHL; through the several points of intersection, and the two poles P, N, as through three given points, describe circles representing all the meridians. The centres for describing the arches will be in the same KL, as being the same that are found by the former intersection; but are to be taken with this caution, that for the meridian next BDN towards A, the most remote centre towards L be taken for the second, the second from this, &c.—The circles of longitude and latitude thus drawn, insert the places from a table.

Maps of this kind may be useful for particular purposes: but the irregular length of the degrees, both of longitude and latitude, render them very unfit for representing the countries in their proper shape; and the difficulties in finding the particular degrees of longitude and latitude are even greater in this than any other projection, as is evident from the inspection of fig. 4.

III. Besides these, there may be a variety of other projections, though few of them are applicable to any particular purpose. The three following are those most generally useful, as having each some peculiar

property which cannot be found in any other but themselves.

1. If, instead of its globular figure, we suppose the earth to have a conical one, it is plain, that the meridians would be represented by straight lines diverging from the apex of the cone, while the parallels are shewn by concentric circles, placed at equal distances. This kind of projection is shewn in the map of the world, Plate CXVII. It hath this great advantage, that the longitudes and latitudes may be found with the greatest ease, by means of a moveable index placed on the centre. The whole earth may also be thus represented on a single circle: but thus the countries towards the south pole are prodigiously augmented in breadth in proportion to their length; for the degrees of longitude constantly increase the farther we are removed from the pole, while those of latitude still remain the same. This apparent error, however, doth not in the least affect the real proportion of the map, or render it more difficult to find the longitudes or latitudes upon it.

2. Mercator's projection supposes the earth, instead of a globular, to have a cylindrical figure; in consequence of which, the degrees of longitude become of an equal length throughout the whole surface, and are marked out on the map by parallel lines. The circles of latitude also are represented by lines crossing the former at right angles, but at unequal distances. The farther we remove from the equator, the longer the degrees of latitude become in proportion to those of longitude, and that in no less a degree than as the secant of an arch to the radius of the circle: that is, if we make one degree of longitude at the equator the radius of a circle; at one degree distant from the equator, a degree of latitude will be expressed by the secant of one degree; at ten degrees distance, by the secant of ten degrees; and so on*. A map of the world, therefore, cannot be delineated upon this projection, without distorting the shape of the countries in an extraordinary manner. The projection itself is, however, very useful in navigation, as it shews the different bearings with perfect accuracy, which cannot be done upon any other map. See the map of the New Discoveries, Plate CXVII.

3. The globular projection, is an invention of M. de la Hire, and is more useful than any of the former for exhibiting the true shape of the countries. It may be made in the following manner: Having drawn a circle, representing one half of the earth's disc, draw two diameters as before, which represent the equator and vertical meridian. Divide each of these into 180 equal parts, for the measures of the degrees of longitude and latitude. Then, through the two poles, and every tenth division on the equator, draw arches of circles for the meridians; and in like manner, through every tenth degree on each semicircle, draw an arch, which shall likewise pass through every tenth division on the meridian, for the parallels of latitude.

IV. The construction of maps of particular parts of the earth requires a different operation. Large portions of its surface may indeed be drawn on the plane of the meridian, as before directed; but when maps, as a small part, as the island of Britain for instance, is to be represented on a large scale, it would be found

PRINCIPLES and PRACTICE

PRINCIPLES and PRACTICE

difficult to draw the arches of such large circles as are necessary, and therefore the following method may be adopted. In this case, the degrees of longitude and latitude may be both represented by straight lines. It is to be remembered, however, that though the degrees of latitude always continue of an equal length, it is not so with those of longitude. They must necessarily decrease as we approach the pole. The proportion in which they decrease, may be found by the line of longitudes on the plain scale; or by the following

TABLE, shewing the Number of Miles contained in a Degree of Longitude, in each Parallel of Latitude from the Equator.

Degrees of Latitude.	Miles.	100th parts of a mile.	Degrees of Latitude.	Miles.	100th parts of a mile.	Degrees of Latitude.	Miles.	100th parts of a mile.
1	59	96	31	51	43	61	29	04
2	59	94	32	50	88	62	28	17
3	59	92	33	50	32	63	27	24
4	59	86	34	49	74	64	26	30
5	59	77	35	49	15	65	25	36
6	59	67	36	48	54	66	24	41
7	59	56	37	47	92	67	23	45
8	59	40	38	47	28	68	22	48
9	59	20	39	46	62	69	21	51
10	59	08	40	46	00	70	20	52
11	58	89	41	45	28	71	19	54
12	58	68	42	44	95	72	18	55
13	58	46	43	43	88	73	17	54
14	58	22	44	42	16	74	16	53
15	58	00	45	42	43	75	15	52
16	57	60	46	41	68	76	14	51
17	57	30	47	41	00	77	13	50
18	57	04	48	40	15	78	12	48
19	56	73	49	39	36	79	11	45
20	56	38	50	38	57	80	10	42
21	56	00	51	37	73	81	09	38
22	55	63	52	37	00	82	08	35
23	55	23	53	36	18	83	07	32
24	54	81	54	35	26	84	06	28
25	54	38	55	34	41	85	05	23
26	54	00	56	33	55	86	04	18
27	53	44	57	32	67	87	03	14
28	53	00	58	31	70	88	02	09
29	52	48	59	30	90	89	01	05
30	51	96	60	30	00	90	00	00

Suppose, then, it is required to draw the meridians and parallels for a map of Britain. This island is known to lie between 50 and 60 degrees of latitude, and two and seven of longitude. Having therefore chosen the length of your degrees of latitude, you must next proportion your degrees of longitude to it. By the table you find, that in the latitude of 50° the length of a degree of longitude is to one of latitude as 38.57 is to 60; that is, a degree of longitude in lat. 50, is somewhat more than half the length of a degree of latitude. The exact proportion may easily be taken by a diagonal scale; after which you are to

mark out seven or eight of those degrees upon a right line, for the length of your intended map. On the extremities of this line raise two perpendiculars, upon which mark out ten degrees of latitude for the height of it. Then, having completed the parallelogram, consult the table for the length of a degree of longitude in Lat. 60°, which is found to be very nearly one half a degree of latitude. It will always be proper, however, to draw a vertical meridian exactly in the middle of the parallelogram, to which the meridian on each side may converge; and from this you are to set off the degrees of longitude on each side. Then, having divided the lines bounding your map into as many parts as can conveniently be done, to serve for a scale, you may by their means set off the longitudes and latitudes with much less trouble than where curve lines are used. This method may always be followed where a particular kingdom is to be delineated, and will represent the true figure and situation of the places with tolerable exactness. The particular points of the compass, on which the towns lie with respect to one another, or their bearings, cannot be exactly known, except by a globe, or Mercator's projection. Their distances, however, may by this means be accurately expressed, and this is the only kind of maps to which a scale of miles can be truly adapted.

§. 2. Description and Use of the Globes and Armillary Sphere.

WHEN we have thus discovered, by means of maps, or any other way, the true situation of the different places of the earth with regard to one another, we may easily know every other particular relative to them; as, how far distant they are from us, what hour of the day it is, what season of the year, &c. at any particular place. As each of these problems, however, would require a particular and sometimes troublesome calculation, machines have been invented, by which all the calculations may be saved, and every problem in geography may be solved mechanically, and in the most easy and expeditious manner. These machines are the celestial and terrestrial globes, and the armillary sphere; of which, and the method of using them, we proceed to give a description.

If a map of the world be accurately delineated on a spherical ball, the surface thereof will represent the surface of the earth: for the highest hills are so inconsiderable with respect to the bulk of the earth, that they take off no more from its roundness than grains of sand do from the roundness of a common globe; for the diameter of the earth is 8000 miles in round numbers, and no known hill upon it is much above three miles in perpendicular height.

For the proof of the earth's being spherical, see ASTRONOMY, n° 123.

With regard to what we call *up* and *down*, see the article GRAVITY.

To an observer placed any where in the indefinite space, where there is nothing to limit his view, all remote objects appear equally distant from him; and seem to be placed in a vast concave sphere, of which his eye is the centre. The moon is much nearer to us than the sun; some of the planets are sometimes nearer, and sometimes farther from us, than the sun; others of them never come so near to us as the sun always is; the

24
The terrestrial globe.

25
The face of
the heavens
and of the
earth repre-
sented in a
machine.

the remotest planet in our system is beyond comparison nearer to us than any of the fixed stars are: and yet all these celestial objects appear equally distant from us. Therefore, if we imagine a large hollow sphere of glass to have as many bright studs fixed to its inside, as there are stars visible in the heaven, and these studs to be of different magnitudes, and placed at the same angular distances from each other as the stars are; the sphere will be a true representation of the starry heaven, to an eye supposed to be in its centre, and viewing it all around. And if a small globe, with a map of the earth upon it, be placed on an axis in the centre of this starry sphere, and the sphere be made to turn round on this axis, it will represent the apparent motion of the heavens round the earth.

If a great circle be so drawn upon this sphere, as to divide it into two equal parts or hemispheres, and the plane of the circle be perpendicular to the axis of the sphere, this circle will represent the *equinoctial*, which divides the heaven into two equal parts, called the *northern* and *southern hemispheres*; and every point of that circle will be equally distant from the *poles*, or ends of the axis in the sphere. That pole which is in the middle of the northern hemisphere, will be called the *north pole of the sphere*; and that which is in the middle of the southern hemisphere, the *south pole*.

If another grand circle be drawn upon the sphere, in such a manner as to cut the equinoctial at an angle of 23½ degrees in two opposite points, it will represent the *ecliptic*, or circle of the sun's apparent annual motion; one half of which is on the north side of the equinoctial, and the other half on the south.

If a large stud be made to move eastward in this ecliptic, in such a manner as to go quite round it in the time that the sphere is turned round westward 366 times upon its axis; this stud will represent the *sun*, changing his place every day a 366th part of the ecliptic; and going round westward, the same way as the stars do; but with a motion so much slower than the motion of the stars, that they will make 366 revolutions about the axis of the sphere, in the time that the sun makes only 365. During one half of these revolutions, the sun will be on the north side of the equinoctial; during the other half, on the south; and at the end of each half, in the equinoctial.

If we suppose the terrestrial globe in this machine to be about one inch in diameter, and the diameter of the starry sphere to be about five or six feet, a small insect on the globe would see only a very little portion of its surface; but it would see one half of the starry sphere, the convexity of the globe hiding the other half from its view. If the sphere be turned westward round the globe, and the insect could judge of the appearances which arise from that motion, it would see some stars rising to its view in the eastern side of the sphere, whilst others were setting on the western: but as all the stars are fixed to the sphere, the same stars would always rise in the same points of view on the east side, and set in the same points of view on the west side. With the sun it would be otherwise; because the sun is not fixed to any point of the sphere, but moves slowly along an oblique circle in it. And if the insect should look towards the south, and call that point of the globe, where the equinoctial in the sphere seems to cut it on the left side, the *east point*; and where it cuts the

globe on the right side, the *west point*; the little animal would see the sun rise north of the east, and set north of the west, for 182½ revolutions; after which, for as many more, the sun would rise south of the east, and set south of the west. And in the whole 365 revolutions, the sun would rise only twice in the east point, and set twice in the west. All these appearances would be the same, if the starry sphere stood still (the sun only moving in the ecliptic) and the earthly globe were turned round the axis of the sphere eastward. For, as the insect would be carried round with the globe, he would be quite insensible of its motion, and the sun and stars would appear to move westward.

We may imagine as many circles described upon the earth as we please; and we may imagine the plane of any circle described upon the earth to be continued, until it marks a circle in the concave sphere of the heavens.

The horizon is either *sensible* or *rational*. The *sensible* horizon is that circle which a man standing upon a large plane observes to terminate his view all around, where the heaven and earth seem to meet. The plane of our sensible horizon continued to the heaven, divides it into two hemispheres; one visible to us, the other hid by the convexity of the earth.

The plane of the *rational horizon*, is supposed parallel to the plane of the sensible; to pass through the centre of the earth, and to be continued to the heavens. And although the plane of the sensible horizon touches the earth in the place of the observer, yet this plane, and that of the rational horizon, will seem to coincide in the heaven, because the whole earth is but a point compared to the sphere of the heaven.

The earth being a spherical body, the horizon, or limit of our view, must change as we change our place.

The *poles of the earth*, are those two points on its surface in which its axis terminates. The one is called the *north pole*, and the other the *south pole*.

The *poles of the heavens*, are those two points in which the earth's axis produced terminates in the heaven; so that the *north pole* of the heaven is directly over the north pole of the earth, and the *south pole* of the heaven is directly over the south pole of the earth.

The *equator* is a great circle upon the earth, every part of which is equally distant from either of the poles. It divides the earth into two equal parts, called the *northern* and *southern hemispheres*. If we suppose the plane of this circle to be extended to the heaven, it will mark the *equinoctial* therein; and will divide the heaven into two equal parts, called the *northern* and *southern hemispheres* of the heaven.

The *meridian* of any place is a great circle passing through that place and the poles of the earth. We may imagine as many such meridians as we please; because any place that is ever so little to the east or west of any other place, has a different meridian from that place; for no one circle can pass through any two such places and the poles of the earth.

The *meridian* of any place is divided by the poles into two semicircles: that which passes thro' the place is called the *geographical*, or *upper*, *meridian*; and that which passes through the opposite place, is called the *lower meridian*.

When the rotation of the earth brings the plane of the

26
The horizon.

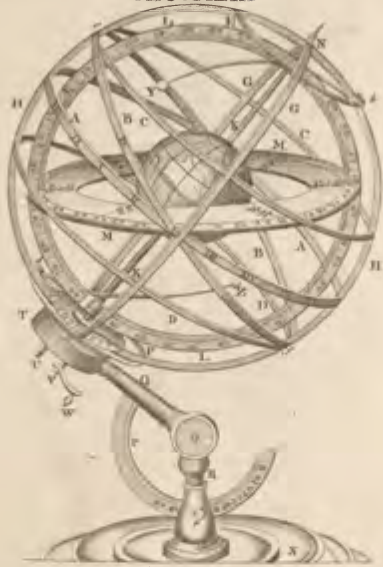
27
The poles.

28
Equator.

29
Meridian.

ARMILLARY

SPHERE



North

North

WORLD

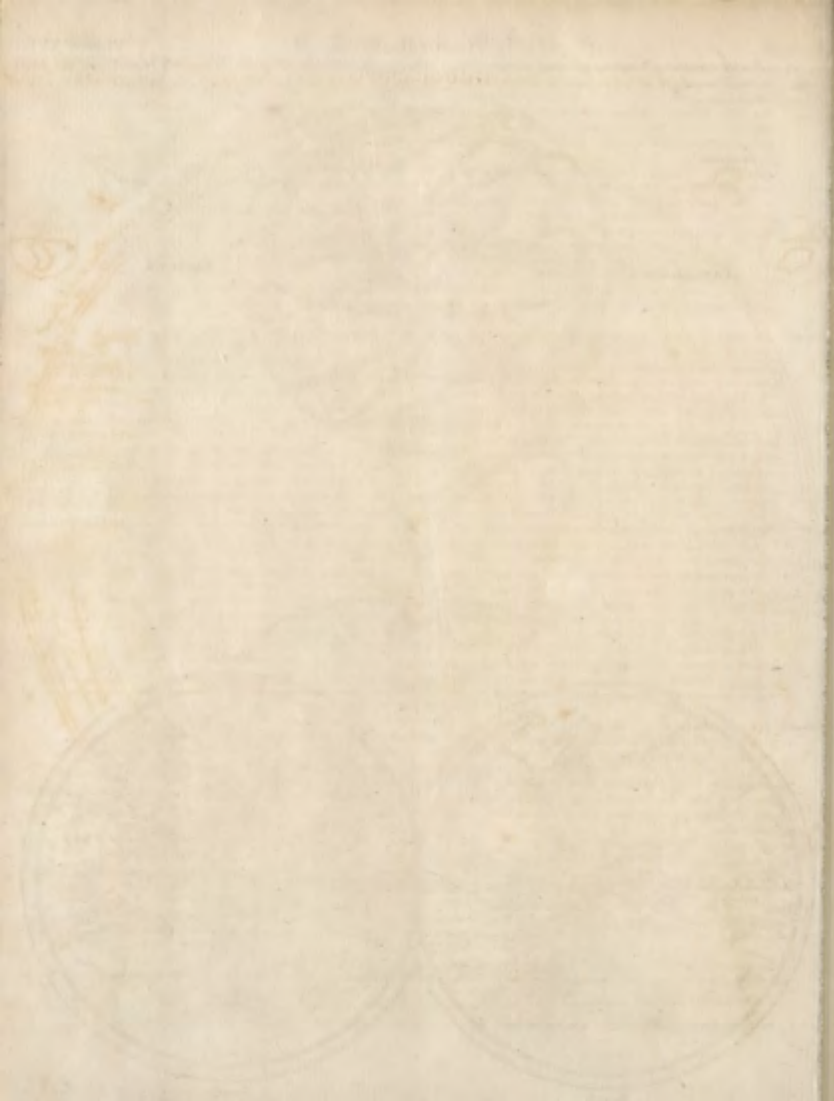
*As delineated before the late
Discoveries*



South

South

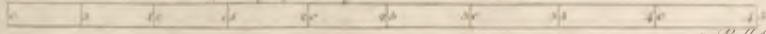
A. Bell Sculp.



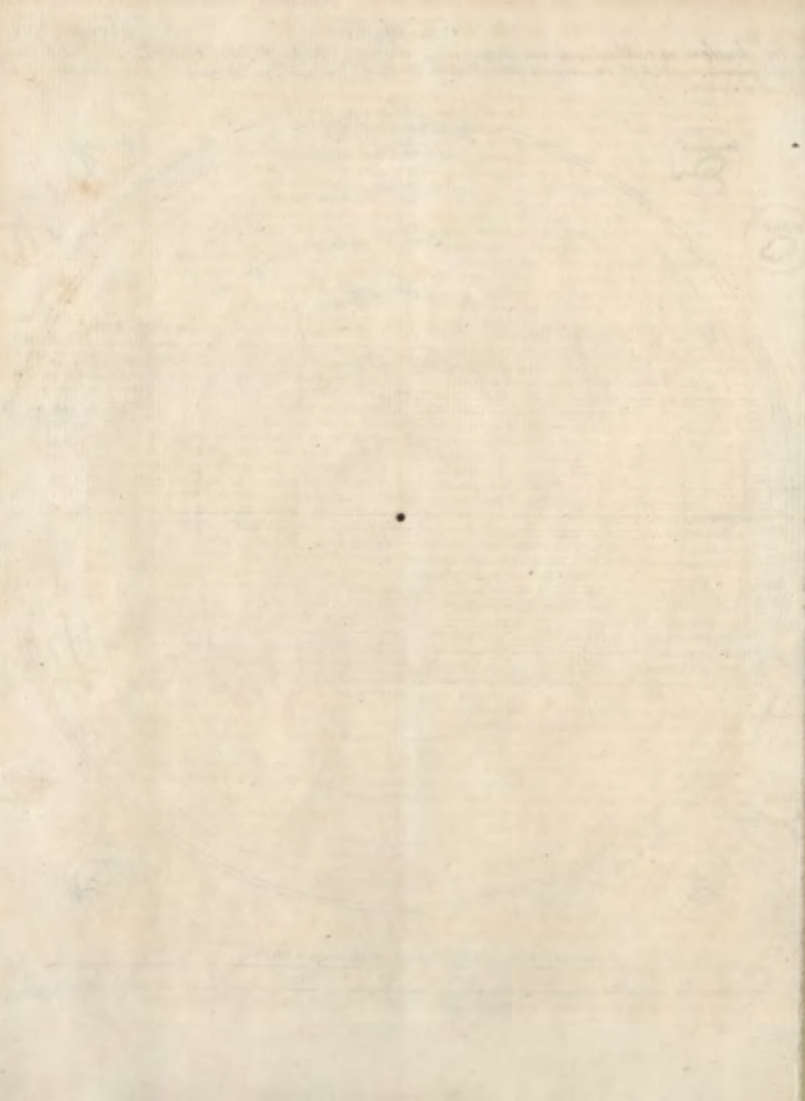
In *Isalemmet*, Shewing the time of Sun rising & sun setting, the length of the Days & Nights, and the point of the Compass on which the Sun rises & sets, for every Degree of Latitude, and for every Degree of the Suns North & South declination.



Method of enlarging this Diagram in Mercators Chart



A. Bell Sculp.



the geographical meridian to the sun, it is *noon* or *mid-day* to that place; and when the lower meridian comes to the sun, it is *mid-night*.

All places lying under the same geographical meridian, have their noon at the same time, and consequently all the other hours. All those places are said to have the same *longitude*, because no one of them lies either eastward or westward from any of the rest.

30
Hour-circles.

If we imagine 24 semicircles, one of which is the geographical meridian of a given place, to meet at the poles, and to divide the equator into 24 equal parts; each of those meridians will come round to the sun in 24 hours, by the earth's equable motion round its axis in that time. And, as the equator contains 360 degrees, there will be 15 degrees contained between any two of these meridians which are nearest to one another: for 24 times 15 is 360. And as the earth's motion is eastward, the sun's apparent motion will be westward, at the rate of 15 degrees each hour. Therefore,

They whose geographical meridian is 15 degrees westward from us, have noon, and every other hour, an hour sooner than we have. They whose meridian is fifteen degrees westward from us, have noon, and every other hour, an hour later than we have: and so on in proportion, reckoning one hour for every fifteen degrees.

31
Tropics.

For the ecliptic circle, signs, and degrees, see ASTRONOMY, n° 122,—137.

The *tropics* are lesser circles in the heaven, parallel to the equinoctial; one on each side of it, touching the ecliptic in the points of its greatest declination; so that each tropic is $23\frac{1}{2}$ degrees from the equinoctial, one on the north side of it, and the other on the south. The northern tropic touches the ecliptic at the beginning of Cancer, the southern at the beginning of Capricorn; for which reason the former is called the *tropic of Cancer*, and the latter the *tropic of Capricorn*.

32
Polar circles.

The *polar circles* in the heaven, are each $23\frac{1}{2}$ degrees from the poles, all around. That which goes round the north pole, is called the *arctic circle*. The south polar circle, is called the *antarctic circle*, from its being opposite to the arctic.

The ecliptic, tropics, and polar circles, are drawn upon the terrestrial globe, as well as upon the celestial. But the ecliptic, being a great fixed circle in the heavens, cannot properly be said to belong to the terrestrial globe; and is laid down upon it only for the convenience of solving some problems. So that, if this circle on the terrestrial globe was properly divided into the months and days of the year, it would not only suit the globe better, but would also make the problems thereon much easier.

1. Description of the Terrestrial Globe.

33
The terrestrial globe described.

THE equator, ecliptic, and tropics, polar circles, and meridians, are laid down upon the globe in the manner already described. The ecliptic is divided into 12 signs, and each sign into 30 degrees. Each tropic is $23\frac{1}{2}$ degrees from the equator, and each polar circle $23\frac{1}{2}$ degrees from its respective pole. Circles are drawn parallel to the equator, at every ten degrees distance from it on each side to the poles: these circles are called *parallels of latitude*. On large globes there

VOL. V.

are circles drawn perpendicularly through every tenth degree of the equator, intersecting each other at the poles: but on globes of or under a foot diameter, they are only drawn through every fifteenth degree of the equator; these circles are generally called *meridians*, sometimes *circles of longitude*, and at other times *hour-circles*.

The globe is hung in a brass-ring called the *brazen meridian*; and turns upon a wire in each pole hung half its thickness into one side of the meridian ring; by which means that side of the ring divides the globe into two equal parts, called the *eastern* and *western hemispheres*; as the equator divides it into two equal parts, called the *northern* and *southern hemispheres*. The ring is divided into 360 equal parts or degrees, on the side wherein the axis of the globe turns. One half of these degrees are numbered, and reckoned, from the equator to the poles, where they end at 90: their use is to shew the latitudes of places. The degrees on the other half of the meridian are numbered from the poles to the equator, where they end at 90: their use is to shew how to elevate either the north or south pole above the horizon, according to the latitude of any given place, as it is north or south of the equator.

The brazen meridian is let into two notches made in a broad flat ring called the *wooden horizon*; the upper surface of which divides the globe into two equal parts, called the *upper* and *lower hemisphere*. One notch is in the north point of the horizon, and the other in the south. On this horizon are several concentric circles, which contain the months and days of the year, the signs and degrees answering to the sun's place for each month and day, and the 32 points of the compass.—The graduated side of the brass meridian lies towards the east side of the horizon, and should be generally kept towards the person who works problems by the globes.

There is a small *horary circle*, so fixed to the north part of the brazen meridian, that the wire in the north pole of the globe is in the centre of that circle; and on the wire is an *index*, which goes over all the 24 hours of the circle, as the globe is turned round its axis. Sometimes there are two horary circles, one between each pole of the globe and the brazen meridian.

There is a thin slip of brass, called the *quadrant of altitude*, which is divided into 90 equal parts or degrees, answering exactly to so many degrees of the equator. It is occasionally fixed to the uppermost point of the brazen meridian by a nut and screw. The divisions end at the nut, and the quadrant is turned round upon it.

2. Description and Use of the Armillary Sphere.

34
Armillary sphere described.

THE exterior parts of this machine are, a compasses of brass rings, which represent the principal circles of the heaven, viz. 1. The equinoctial *AA*, which is divided into 360 degrees (beginning at its intersection with the ecliptic in Aries) for shewing the sun's right ascension in degrees; and also into 24 hours, for shewing his right ascension in time. 2. The ecliptic *BB*, which is divided into 12 signs, and each sign into 30 degrees, and also into the months and days of the year; in such a manner, that the degree or point of the ecliptic in which the sun is, on any given day, stands over that day in the circle of months. 3. The

Plate CXVI
fig. 1.

tropic of Cancer *CC*, touching the ecliptic at the beginning of Cancer in *e*, and the tropic of Capricorn *DD*, touching the ecliptic at the beginning of Capricorn in *f*; each $23\frac{1}{2}$ degrees from the equinoctial circle. 4. The arctic circle *E*, and the antarctic circle *F*, each $23\frac{1}{2}$ degrees from its respective pole at *N* and *S*. 5. The equinoctial circle *GG*, passing through the north and south poles of the heaven at *N* and *S*, and through the equinoctial points Aries and Libra, in the ecliptic. 6. The solstitial circle *HH*, passing through the poles of the heaven, and through the solstitial points Cancer and Capricorn in the ecliptic. Each quarter of the former of these circles is divided into 90 degrees, from the equinoctial to the poles of the world, for shewing the declination of the sun, moon, and stars; and each quarter of the latter, from the ecliptic at *e* and *f*, to its poles *b* and *d*, for shewing the latitude of the stars.

In the north pole of the ecliptic is a nut *b*, to which is fixed one end of a quadrantal wire, and to the other end a small sun *T*, which is carried round the ecliptic *BB*, by turning the nut; and in the south pole of the ecliptic is a pin *d*, on which is another quadrantal wire, with a small moon *Z* upon it, which may be moved round by the hand: but there is a particular contrivance for causing the moon to move in an orbit which crosses the ecliptic at an angle of $5\frac{1}{2}$ degrees, in two opposite points called the *moon's nodes*; and also for shifting these points backward in the ecliptic, as the *moon's nodes* shift in the heaven.

Within these circular rings is a small terrestrial globe *I*, fixt on an axis *KK*, which extends from the north and south poles of the globe at *n* and *s*, to those of the celestial sphere at *N* and *S*. On this axis is fixed the flat celestial meridian *LL*, which may be set directly over the meridian of any place on the globe, and then turned round with the globe, so as to keep over the same meridian upon it. This flat meridian is graduated the same way as the brass meridian of a common globe, and its use is much the same. To this globe is fitted the moveable horizon *MM*, so as to turn upon two strong wires proceeding from its east and west points to the globe, and entering the globe at the opposite points of its equator, which is a moveable brass ring let into the globe in a groove all around its equator. The globe may be turned by hand within this ring, so as to place any given meridian upon it, directly under the celestial meridian *LL*. The horizon is divided into 360 degrees all around its outermost edge, within which are the points of the compass for shewing the amplitude of the sun and moon both in degrees and points. The celestial meridian *LL*, passes thro' two notches in the north and south points of the horizon, as in a common globe: but here, if the globe be turned round, the horizon and meridian turn with it. At the south pole of the sphere is a circle of 24 hours, fixed to the rings; and on the axis is an index which goes round that circle, if the globe be turned round its axis.

The whole fabric is supported on a pedestal *N*, and may be elevated or depressed upon the joint *O*, to any number of degrees from 0 to 90, by means of the arc *P*, which is fixed in the strong brass arm *Q*, and slides in the upright piece *R*, in which is a screw at *r*, to fix it at any proper elevation.

In the box *T* are two wheels (as in Dr Long's PRINCIPLES and PRACTICE sphere), and two pinions, whose axes come out at *V* and *U*; either of which may be turned by the small winch *W*. When the winch is put upon the axis *V*, and turned backward, the terrestrial globe, with its horizon and celestial meridian, keep at rest; and the whole sphere of circles turns round from east, by south, to west, carrying the sun *T*, and moon *Z*, round the same way, and causing them to rise above and set below the horizon. But when the winch is put upon the axis *U*, and turned forward, the sphere with the sun and moon keep at rest; and the earth, with its horizon and meridian, turn round from west, by south, to east; and bring the same points of the horizon to the sun and moon, to which these bodies came when the earth kept at rest and they were carried round it; shewing that they rise and set in the same points of the horizon, and at the same times in the hour-circle, whether the motion be in the earth or in the heaven. If the earthly globe be turned, the hour-index goes round its hour-circle; but if the sphere be turned, the hour-circle goes round below the index.

And so, by this construction, the machine is equally fitted to shew either the real motion of the earth, or the apparent motion of the heaven.

To rectify the sphere for use, first slacken the screw *r* in the upright stem *R*, and taking hold of the arm *Q*, move it up or down until the given degree of latitude for any place be at the side of the stem *R*; and then the axis of the sphere will be properly elevated so as to stand parallel to the axis of the world, if the machine be set north and south by a small compass: this done, count the latitude from the north pole, upon the celestial meridian *LL*, down towards the north notch of the horizon, and set the horizon to that latitude; then, turn the nut *b* until the sun *T* comes to the given day of the year in the ecliptic, and the sun will be at its proper place for that day: find the place of the moon's ascending node, and also the place of the moon, by an Ephemeris, and set them right accordingly: lastly, turn the winch *W*, until either the sun comes to the meridian *LL*, or until the meridian comes to the sun (according as you want the sphere or earth to move) and set the hour-index to the XII, marked noon, and the whole machine will be rectified.

—Then turn the winch, and observe when the sun or moon rise and set in the horizon, and the hour-index will shew the times thereof for the given day.

As those who understand the use of the globes will be at no loss to work many other problems by this sphere, it is needless to enlarge any farther upon it.

3. Directions for using Globes.

In using globes, keep the east side of the horizon towards you (unless the problem requires the turning of it), which side you may know by the word East upon the horizon; for then you have the graduated side of the meridian towards you, the quadrant of altitude before you, and the globe divided exactly into two equal parts, by the graduated side of the meridian.

In working some problems, it will be necessary to turn the whole globe and horizon about, that you may for using the terrestrial globe, look on the west side thereof; which turning will be apt to jog the ball so, as to shift away that degree of the

the globe which was before set to the horizon or meridian: to avoid which inconvenience, you may thrust in the feather-end of a quill between the ball of the globe and the brazen meridian; which, without hurting the ball, will keep it from turning in the meridian, whilst you turn the west side of the horizon towards you.

PROB. I. *To find the latitude and longitude of any given place upon the globe.*—Turn the globe on its axis, until the given place comes exactly under that graduated side of the brazen meridian on which the degrees are numbered from the equator; and observe what degree of the meridian the place then lies under; which is its latitude, north or south, as the place is north or south of the equator.

The globe remaining in this position, the degree of the equator, which is under the brazen meridian, is the longitude of the place, which is east or west, as the place lies on the east or west side of the first meridian of the globe.—All the Atlantic ocean, and America, is on the west side of the meridian of London; and the greatest part of Europe, and of Africa, together with all Asia, is on the east side of the meridian of London, which is reckoned the *first meridian* of the globe by the British geographers and astronomers.

PROB. II. *The longitude and latitude of a place being given, to find that place on the globe.*—Look for the given longitude in the equator (counting it eastward or westward from the first meridian, as it is mentioned to be east or west;) and bringing the point of longitude in the equator to the brazen meridian, on that side which is above the fourth point of the horizon: then count from the equator, on the brazen meridian, to the degree of the given latitude, towards the north or south pole, according as the latitude is north or south; and under that degree of latitude on the meridian, you will have the place required.

PROB. III. *To find the difference of longitude, or difference of latitudes, between any two given places.*—Bring each of these places to the brazen meridian, and see what its latitude is: the lesser latitude subtracted from the greater, if both places are on the same side of the equator, or both latitudes added together if they are on different sides of it, is the difference of latitude required. And the number of degrees contained between these places, reckoned on the equator, when they are brought separately under the brazen meridian, is their difference of longitude, if it be less than 180; but if more, let it be subtracted from 360, and the remainder is the difference of longitude required. Or,

Having brought one of the places to the brazen meridian, and set the hour-index to XII, turn the globe until the other place comes to the brazen meridian; and the number of hours and parts of an hour, passed over by the index, will give the longitude in time; which may be easily reduced to degrees, by allowing 15 degrees for every hour, and one degree for every four minutes.

N. B. When we speak of bringing any place to the brazen meridian, it is the graduated side of the meridian that is meant.

PROB. IV. *Any place being given, to find all those places that have the same longitude or latitude with it.*—Bring the given place to the brazen meridian; then all those places which lie under that side of the meri-

dian, from pole to pole, have the same longitude with the given place. Turn the globe round its axis; and all those places which pass under the same degree of the meridian that the given place does, have the same latitude with that place.

Since all latitudes are reckoned from the equator, and all longitudes are reckoned from the first meridian, it is evident, that the point of the equator which is cut by the first meridian, has neither latitude nor longitude.—The greatest latitude is 90 degrees, because no place is more than 90 degrees from the equator: And the greatest longitude is 180 degrees, because no place is more than 180 degrees from the first meridian.

PROB. V. *To find the antæci, periæci, and antipodes, of any given place.*—Bring the given place to the brazen meridian; and having found its latitude, keep the globe in that situation, and count the same number of degrees of latitude from the equator towards the contrary pole; and where the reckoning ends, you have the *antæci* of the given place upon the globe. Those who live at the equator have no *antæci*.

The globe remaining in the same position, set the hour-index to the upper XII on the horary circle, and turn the globe until the index comes to the lower XII; then, the place which lies under the meridian, in the same latitude with the given place, is the *periæci* required. Those who live at the poles have no *periæci*.

As the globe now stands (with the index at the lower XII), the *antipodes* of the given place will be under the same point of the brazen meridian where its *antæci* stood before. Every place upon the globe has its *antipodes*.

PROB. VI. *To find the distance between any two places on the globe.*—Lay the graduated edge of the quadrant of altitude over both the places, and count the number of degrees intercepted between them on the quadrant; then multiply these degrees by 60, and the product will give the distance in geographical miles: but to find the distance in miles, multiply the degrees by 69½, and the product will be the number of miles required. Or, take the distance betwixt any two places with a pair of compasses, and apply that extent to the equator; the number of degrees, intercepted between the points of the compasses, is the distance in degrees of a great circle; which may be reduced either to geographical miles, or to English miles, as above.

PROB. VII. *A place on the globe being given, and its distance from any other place; to find all the other places upon the globe which are at the same distance from the given place.*—Bring the given place to the brazen meridian, and screw the quadrant of altitude to the meridian directly over that place; then keeping the globe in that position, turn the quadrant quite round upon it, and the degree of the quadrant that touches the second place will pass over all the other places which are equally distant with it from the given place.

This is the same as if one foot of a pair of compasses was set in the given place, and the other foot extended to the second place, whose distance is known; for if the compasses be then turned round the first place as a centre, the moving foot will go over all those places which are at the same distance with the

PRINCIPLES and PRACTICE second from it.

PROB. VIII. *The hour of the day at any place being given, to find all those places where it is noon at that time.*—Bring the given place to the brazen meridian, and set the index to the given hour; this done, turn the globe until the index points to the upper XII, and then all the places that lie under the brazen meridian have noon at that time.

N. B. The upper XII always stands for noon; and when the bringing of any place to the brazen meridian is mentioned, the side of that meridian on which the degrees are reckoned from the equator is meant, unless the contrary side be mentioned.

PROB. IX. *The hour of the day at any place being given, to find what o'clock it then is at any other place.*—Bring the given place to the brazen meridian, and set the index to the given hour; then turn the globe, until the place where the hour is required comes to the meridian, and the index will point out the hour at that place.

PROB. X. *To find the sun's place in the ecliptic, and his declination, for any given day of the year.*—Look on the horizon for the given day, and right against it you have the degree of the sign in which the sun is (or his place) on that day at noon. Find the same degree of that sign in the ecliptic line upon the globe, and having brought it to the brazen meridian, observe what degree of the meridian stands over it; for that is the sun's declination, reckoned from the equator.

PROB. XI. *The day of the month being given, to find all those places of the earth over which the sun will pass vertically on that day.*—Find the sun's place in the ecliptic for the given day, and having brought it to the brazen meridian, observe what point of the meridian is over it; then, turning the globe round its axis, all those places which pass under that point of the meridian are the places required; for as their latitude is equal, in degrees and parts of a degree, to the sun's declination, the sun must be directly over-head to each of them at its respective noon.

PROB. XII. *A place being given in the torrid zone, to find those two days of the year on which the sun shall be vertical to that place.*—Bring the given place to the brazen meridian, and mark the degree of latitude that is exactly over it on the meridian; then turn the globe round its axis, and observe the two degrees of the ecliptic which pass exactly under that degree of latitude: lastly, find on the wooden horizon, the two days of the year in which the sun is in those degrees of the ecliptic, and they are the days required: for on them, and none else, the sun's declination is equal to the latitude of the given place; and consequently, he will then be vertical to it at noon.

PROB. XIII. *To find all those places of the north frigid zone, where the sun begins to shine constantly without setting, on any given day, from the 21st of March to the 23d of September.*—On these two days, the sun is in the equinoctial, and enlightens the globe exactly from pole to pole: therefore, as the earth turns round its axis, which terminates in the poles, every place upon it will go equally through the light and the dark, and so make the day and night equal to all places of the earth. But as the sun declines from the equator, towards either pole, he will shine just as many degrees round that pole, as are equal to his declination from

the equator: so that no place within that distance of the pole will then go through any part of the dark, and consequently the sun will not set to it. Now, as the sun's declination is northward, from the 21st of March to the 23d of September, he must constantly shine round the north pole all that time; and on the day that he is in the northern tropic, he shines upon the whole north frigid zone; so that no place within the north polar circle goes through any part of the dark on that day. Therefore,

Having brought the sun's place for the given day to the brazen meridian, and found his declination (by Prob. IX.) count as many degrees on the meridian, from the north pole, as are equal to the sun's declination from the equator, and mark that degree from the pole where the reckoning ends: then turning the globe round its axis, observe what places in the north frigid zone pass directly under that mark; for they are the places required.

The like may be done for the south frigid zone, from the 23d of September to the 21st of March, during which time the sun shines constantly on the south pole.

PROB. XIV. *To find the place over which the sun is vertical at any hour of a given day.*—Having found the sun's declination for the given day (by Prob. X.) mark it with a chalk on the brazen meridian: then bring the place where you are (suppose Edinburgh) to the brazen meridian, and set the index to the given hour; which done, turn the globe on its axis, until the index points to XII at noon; and the place on the globe, which is then directly under the point of the sun's declination marked upon the meridian, has the sun that moment in the zenith, or directly over head.

PROB. XV. *The day and hour of a lunar eclipse being given; to find all those places of the earth to which it will be visible.*—The moon is never eclipsed but when she is full, and so directly opposite to the sun, that the earth's shadow falls upon her. Therefore, whatever place of the earth the sun is vertical to at that time, the moon must be vertical to the antipodes of that place: so that the sun will be then visible to one half of the earth, and the moon to the other.

Find the place to which the sun is vertical at the given hour (by Prob. XIV.) elevate the pole to the latitude of that place, and bring the place to the upper part of the brazen meridian, as in the former problem: then, as the sun will be visible to all those parts of the globe which are above the horizon, the moon will be visible to all those parts which are below it, at the time of her greatest obscuration.

PROB. XVI. *To rectify the globe for the latitude, the zenith, and the sun's place.*—Find the latitude of the place, (by Prob. I.) and if the place be in the northern hemisphere, raise the north pole above the north point of the horizon, as many degrees (counted from the pole upon the brazen meridian) as are equal to the latitude of the place. If the place be in the southern hemisphere, raise the south pole above the south point of the horizon as many degrees as are equal to the latitude. Then, turn the globe till the place comes under its latitude on the brazen meridian, and fasten the quadrant of altitude so, that the chattered edge of its nut (which is even with the graduated

ated edge) may be joined to the zenith, or point of latitude. This done, bring the sun's place in the ecliptic for the given day (found by Prob. X.) to the graduated side of the brazen meridian, and set the hour-index to XII at noon, which is the uppermost XII on the hour-circle; and the globe will be rectified.

PROB. XVII. *The latitude of any place, not exceeding $66\frac{1}{2}$ degrees, and the day of the month, being given; to find the time of sun rising and setting; and consequently the length of the day and night.*—Having rectified the globe for the latitude, and for the sun's place on the given day (as directed in the preceding problem), bring the sun's place in the ecliptic to the eastern side of the horizon, and the hour-index will shew the time of sun-rising; then turn the globe on its axis, until the sun's place comes to the western side of the horizon, and the index will shew the time of sun-setting.

The hour of sun-setting doubled, gives the length of the day; and the hour of sun-rising doubled, gives the length of the night.

PROB. XVIII. *The latitude of any place, and the day of the month, being given; to find when the morning twilight begins, and the evening twilight ends, at that place.*—This problem is often limited: for, when the sun does not go 18 degrees below the horizon, the twilight continues the whole night; and for several nights together in summer, between 49 and $66\frac{1}{2}$ degrees of latitude; and the nearer to 66 $\frac{1}{2}$, the greater is the number of these nights. But when it does begin and end, the following method will shew the time for any given day.

Rectify the globe, and bring the sun's place in the ecliptic to the eastern side of the horizon; then mark with a chalk that point of the ecliptic which is in the western side of the horizon, it being the point opposite to the sun's place: this done, lay the quadrant of altitude over the said point, and turn the globe eastward, keeping the quadrant at the chalk mark, until it is just 18 degrees high on the quadrant; and the index will point out the time when the morning twilight begins: for the sun's place will then be 18 degrees below the eastern side of the horizon. To find the time when the evening twilight ends, bring the sun's place to the western side of the horizon; and the point opposite to it, which was marked with the chalk, will be rising in the east: then, bring the quadrant over that point, and keeping it thereon, turn the globe westward, until the said point be 18 degrees above the horizon on the quadrant, and the index will shew the time when the evening twilight ends; the sun's place being then 18 degrees below the western side of the horizon.

PROB. XIX. *To find on what day of the year the sun begins to shine constantly without setting, on any given place in the north frigid zone; and how long he continues to do so.*—Rectify the globe to the latitude of the place, and turn it about until some point of the ecliptic, between Aries and Cancer, coincides with the north point of the horizon where the brazen meridian cuts it; then find, on the wooden horizon, what day of the year the sun is in that point of the ecliptic; for that is the day on which the sun begins to shine constantly on the given place, without setting. This done, turn the globe, until some point of the ecliptic, between

Cancer and Libra, coincides with the north point of the horizon, where the brazen meridian cuts it; and find, on the wooden horizon, on what day the sun is in that point of the ecliptic; which is the day that the sun leaves off constantly shining on the said place, and rises and sets to it as to other places on the globe. The number of natural days, or complete revolutions of the sun about the earth, between the two days above found, is the time that the sun keeps constantly above the horizon without setting; for all that portion of the ecliptic, which lies between the two points which intersect the horizon in the very north, never sets below it; and there is just as much of the opposite part of the ecliptic that never rises: therefore, the sun will keep as long constantly below the horizon in winter, as above it in summer.

PROB. XX. *To find in what latitude the sun shines constantly without setting, for any length of time less than 182 $\frac{1}{2}$ of our days and nights.*—Find a point in the ecliptic half as many degrees from the beginning of Cancer (either toward Aries or Libra) as there are natural days in the time given; and bring that point to the north side of the brazen meridian, on which the degrees are numbered from the pole towards the equator: then, keep the globe from turning on its axis, and slide the meridian up or down until the forefaid point of the ecliptic comes to the north point of the horizon, and then the elevation of the pole will be equal to the latitude required.

PROB. XXI. *The latitude of a place, not exceeding $66\frac{1}{2}$ degrees, and the day of the month, being given; to find the sun's amplitude or point of the compass on which he rises or sets.*—Rectify the globe, and bring the sun's place to the eastern side of the horizon; then observe what point of the compass on the horizon stands right against the sun's place, for that is his amplitude at rising. This done, turn the globe westward, until the sun's place comes to the western side of the horizon, and it will out the point of his amplitude at setting. Or, you may count the rising amplitude in degrees, from the east point of the horizon, to that point where the sun's place cuts it; and the setting amplitude, from the west point of the horizon, to the sun's place at setting.

PROB. XXII. *The latitude, the sun's place, and his altitude, being given; to find the hour of the day, and the sun's azimuth, or number of degrees that he is distant from the meridian.*—Rectify the globe, and bring the sun's place to the given height upon the quadrant of altitude; on the eastern side of the horizon, if the time be in the forenoon; or the western side, if it be in the afternoon: then the index will shew the hour; and the number of degrees in the horizon, intercepted between the quadrant of altitude and the south point, will be the sun's true azimuth at that time.

PROB. XXIII. *The latitude, hour of the day, and the sun's place, being given; to find the sun's altitude and azimuth.*—Rectify the globe, and turn it until the index points to the given hour; then lay the quadrant of altitude over the sun's place in the ecliptic, and the degree of the quadrant cut by the sun's place is his altitude at that time above the horizon; and the degree of the horizon cut by the quadrant is the sun's azimuth, reckoned from the south.

PROB. XXIV. *The latitude, the sun's altitude, and his*

his azimuth being given; to find his place in the ecliptic, the day of the month, and hour of the day, though they had all been left.—Rectify the globe for the latitude and zenith, and set the quadrant of altitude to the given azimuth in the horizon; keeping it there, turn the globe on its axis until the ecliptic cuts the quadrant in the given altitude: that point of the ecliptic which cuts the quadrant there, will be the sun's place; and the day of the month answering thereto, will be found over the like place of the sun on the wooden horizon. Keep the quadrant of altitude in that position; and, having brought the sun's place to the brazen meridian, and the hour-index to XII at noon, turn back the globe, until the sun's place cuts the quadrant of altitude again, and the index will shew the hour.

Any two points of the ecliptic, which are equidistant from the beginning of Cancer or of Capricorn, will have the same altitude and azimuth at the same hour, though the months be different; and therefore it requires some care in this problem, not to mistake both the month and the day of the month: to avoid which, observe, that from the 20th of March to the 21st of June, that part of the ecliptic which is between the beginning of Aries and beginning of Cancer is to be used; from the 21st of June to the 23d of September, between the beginning of Cancer and beginning of Libra; from the 23d of September to the 21st of December, between the beginning of Libra and the beginning of Capricorn; and from the 21st of December to the 20th of March, between the beginning of Capricorn and beginning of Aries. And as one can never be at a loss to know in what quarter of the year he takes the sun's altitude and azimuth, the above caution with regard to the quarters of the ecliptic will keep him right as to the month and day thereof.

PROB. XXV. *To find the length of the longest day at any given place.*—If the place be on the north side of the equator (find its latitude by Prob. I.) and elevate the north pole to that latitude; then, bring the beginning of Cancer to the brazen meridian, and set the hour-index to XII at noon. But if the given place be on the south side of the equator, elevate the south pole to its latitude, and bring the beginning of Capricorn to the brazen meridian, and the hour-index to XII. This done, turn the globe westward, until the beginning of Cancer or Capricorn (as the latitude is north or south) comes to the horizon; and the index will then point out the time of sun-setting, for it will have gone over all the afternoon hours, between mid-day and sun-set; which length of time being doubled, will give the whole length of the day from sun-rising to sun-setting. For, in all latitudes, the sun rises as long before mid-day, as he sets after it.

PROB. XXVI. *To find in what latitude the longest day is, of any given length, less than 24 hours.*—If the latitude be north, bring the beginning of Cancer to the brazen meridian, and elevate the north pole to about $66\frac{1}{2}$ degrees; but if the latitude be south, bring the beginning of Capricorn to the meridian, and elevate the south pole to about $66\frac{1}{2}$ degrees; because the longest day in north latitude is, when the sun is in the first point of Cancer; and in south latitude, when he is in the first point of Capricorn. Then set the hour-index to XII at noon, and turn the globe west-

ward, until the index points at half the number of hours given; which done, keep the globe from turning on its axis, and slide the meridian down in the notches, until the aforesaid point of the ecliptic (*viz.* Cancer or Capricorn) comes to the horizon; then, the elevation of the pole will be equal to the latitude required.

PROB. XXVII. *The latitude of any place, not exceeding $66\frac{1}{2}$ degrees, being given; to find in what climate the place is.*—Find the length of the longest day at the given place, by Prob. XXV. and whatever be the number of hours whereby it exceedeth twelve, double that number, and the sum will give the climate in which the place is.

PROB. XXVIII. *The latitude, and the day of the month, being given; to find the hour of the day when the sun shines.*—Set the wooden horizon truly level, and the brazen meridian due north and south by a mariner's compass; then, having rectified the globe, stick a small sewing-needle into the sun's place in the ecliptic, perpendicular to that part of the surface of the globe: this done, turn the globe on its axis, until the needle comes to the brazen meridian, and set the hour-index to XII at noon; then, turn the globe on its axis, until the needle points exactly towards the sun (which it will do when it casts no shadow on the globe), and the index will shew the hour of the day.

4. The Use of the Celestial Globe.

HAVING done for the present with the terrestrial globe, we shall proceed to the use of the celestial; first premising, that as the equator, ecliptic, tropics, polar-circles, horizon, and brazen meridian, are exactly alike on both globes, all the former problems concerning the sun are solved the same way by both globes. The method also of rectifying the celestial globe is the same as rectifying the terrestrial. *N. B.* The sun's place for any day of the year stands directly over that day on the horizon of the celestial globe, as it does on that day of the terrestrial.

The latitude and longitude of the stars, or of all other celestial phenomena, are reckoned in a very different manner from the latitude and longitude of places on the earth: for all terrestrial latitudes are reckoned from the equator; and longitudes from the meridian of some remarkable place, as of London by the British, and of Paris by the French. But the astronomers of all nations agree in reckoning the latitudes of the moon, stars, planets, and comets, from the ecliptic; and their longitudes from the equinoctial colure, in that semi-circle of it which cuts the ecliptic at the beginning of Aries; and thence eastward, quite round, to the same semi-circle again. Consequently those stars which lie between the equinoctial and the northern half of the ecliptic, have north declination and south latitude; those which lie between the equinoctial and the southern half of the ecliptic, have south declination and north latitude; and all those which lie between the tropics and poles, have their declinations and latitudes of the same denomination.

There are six great circles on the celestial globe, which cut the ecliptic perpendicularly, and meet in two opposite points in the polar circles; which points are each ninety degrees from the ecliptic, and are called

36

How to use the celestial globe.

37

Latitude and longitude of the stars.

led its poles. These polar points divide those circles into 12 femicircles; which cut the ecliptic at the beginnings of the twelve signs. They resemble so many meridians on the terrestrial globe : and as all places which lie under any particular meridian-femicircle on that globe, have the same longitude; so all those points of the heaven, through which any of the above femicircles are drawn, have the same longitude.—And as the greatest latitudes on the earth are at the north and south poles of the earth, so the greatest latitudes in the heaven are at the north and south poles of the ecliptic.

For the division of the stars into constellations, &c. see ASTRONOMY, n° 203. 206.

PROB. I. *To find the right ascension and declination of the sun, or any fixed star.*—Bring the sun's place in the ecliptic to the brass meridian : then that degree in the equinoctial which is cut by the meridian, is the sun's *right ascension* ; and that degree of the meridian which is over the sun's place, is his *declination*. Bring any fixed star to the meridian, and its right ascension will be cut by the meridian in the equinoctial ; and the degree of the meridian that stands over it, is its declination.

So that right ascension and declination, on the celestial globe, are found in the same manner as longitude and latitude on the terrestrial.

PROB. II. *To find the latitude and longitude of any star.*—If the given star be on the north side of the ecliptic, place the 90th degree of the quadrant of altitude on the north pole of the ecliptic, where the twelve femicircles meet, which divide the ecliptic into the 12 signs ; but if the star be on the south side of the ecliptic, place the 90th degree of the quadrant on the south pole of the ecliptic : keeping the 90th degree of the quadrant on the proper pole, turn the quadrant about, until its graduated edge cuts the star : then, the number of degrees in the quadrant, between the ecliptic and the star, is its latitude ; and the degree of the ecliptic, cut by the quadrant, is the star's longitude, reckoned according to the sign in which the quadrant then is.

PROB. III. *To represent the face of the starry firmament, as seen from any given place of the earth, at any hour of the night.*—Rectify the celestial globe for the given latitude, the zenith, and sun's place, in every respect, as taught by the XVIIth problem for the terrestrial ; and turn it about, until the index points to the given hour : then, the upper hemisphere of the globe will represent the visible half of the heaven for that time ; all the stars upon the globe being then in such situations, as exactly correspond to those in the heaven. And if the globe be placed duly north and south, by means of a small sea-compass, every star in the globe will point toward the like star in the heaven : by which means, the constellations and remarkable stars may be easily known. All those stars which are in the eastern side of the horizon, are then rising in the eastern side of the heaven ; all in the western, are setting in the western side ; and all those under the upper part of the brass meridian, between the fourth point of the horizon and the north pole, are at their greatest altitude, if the latitude of the place be north ; but if the latitude be south, those stars which lie under the upper part of the meridian, between the

north point of the horizon and the south pole, are at their greatest altitude.

PROB. IV. *The latitude of the place, and day of the month, being given ; to find the time when any known star will rise, or be upon the meridian, or set.*—Having rectified the globe, turn it about until the given star comes to the eastern side of the horizon, and the index will shew the time of the star's rising ; then turn the globe westward, and when the star comes to the brass meridian, the index will shew the time of the star's coming to the meridian of your place ; lastly, turn on, until the star comes to the western side of the horizon, and the index will shew the time of the star's setting. *N. B.* In northern latitudes, those stars which are less distant from the north pole than the quantity of its elevation above the north point of the horizon, never set ; and those which are less distant from the south pole than the number of degrees by which it is depressed below the horizon, never rise : and *vice versa* in southern latitudes.

PROB. V. *To find at what time of the year a given star will be upon the meridian, at a given hour of the night.*—Bring the given star to the upper femicircle of the brass meridian, and set the index to the given hour ; then turn the globe, until the index points to XII at noon, and the upper femicircle of the meridian will then cut the star's place, answering to the day of the year sought ; which day may be easily found against the like place of the sun among the signs on the wooden horizon.

PROB. VI. *The latitude, day of the month, and azimuth of any known star, being given ; to find the hour of the night.*—Having rectified the globe for the latitude, zenith, and sun's place, lay the quadrant of altitude to the given degree of azimuth in the horizon : then turn the globe on its axis, until the star comes to the graduated edge of the quadrant ; and when it does, the index will point out the hour of the night.

PROB. VII. *The latitude of the place, the day of the month, and altitude of any known star, being given ; to find the hour of the night.*—Rectify the globe as in the former problem, guess at the hour of the night, and turn the globe until the index points at the supposed hour : then lay the graduated edge of the quadrant of altitude over the known star ; and if the degree of the star's height in the quadrant upon the globe answers exactly to the degree of the star's observed altitude in the heaven, you have guessed exactly : but if the star on the globe is higher or lower than it was observed to be in the heaven, turn the globe backwards or forwards, keeping the edge of the quadrant upon the star, until its centre comes to the observed altitude in the quadrant ; and then the index will shew the true time of the night.

PROB. VIII. *An easy method for finding the hour of the night by any two known stars, without knowing either their altitude or azimuth ; and then, of finding both their altitude and azimuth, and thereby the true meridian.*—Tie one end of a thread to a common musket-bullet ; and, having rectified the globe as above, hold the other end of the thread in your hand, and carry it slowly round betwixt your eye and the starry heaven, until you find it cuts any two known stars at once. Then guessing at the hour of the night, turn the globe until the index points to that time in the hour-circle ;

which

PRINCIPLES
and
PRACTICE

which done, lay the graduated edge of the quadrant over any one of these two stars on the globe, which the thread cut in the heaven. If the said edge of the quadrant cuts the other star also, you have guessed the time exactly; but if it does not, turn the globe slowly backwards or forwards, until the quadrant (kept upon either star) cuts them both through their centres: and then, the index will point out the exact time of the night; the degree of the horizon, cut by the quadrant, will be the true azimuth of both these stars from the south; and the stars themselves will cut their true altitudes in the quadrant. At which moment, if a common azimuth-compass be so set upon a floor or level pavement, that these stars in the heaven may have the same bearing upon it (allowing for the variation of the needle) as the quadrant of altitude has in the wooden horizon of the globe, a thread extended over the north and south points of that compass will be directly in the plane of the meridian: and if a line be drawn upon the floor or pavement, along the course of the thread, and an upright wire be placed in the fourth-most end of the line, the shadow of the wire will fall upon that line, when the sun is on the meridian, and shines upon the pavement.

PROB. IX. *To find the place of the moon, or of any planet; and thereby to shew the time of its rising, setting, and passing South in Danks's or Weaver's ephemeris the geocentric place of the moon or planet in the ecliptic, for the given day of the month; and, according to its longitude and latitude, as shewn by the ephemeris, mark the same with a chalk upon the globe. Then, having rectified the globe, turn it round its axis westward; and as the said mark comes to the eastern side of the horizon, to the brazen meridian, and to the western side of the horizon, the index will shew at what time the planet rises, comes to the meridian, and sets, in the same manner as it would do for a fixed star.*

For an explanation of the harvest-moons by a globe, see ASTRONOMY, n° 168.

For the description and use of a planetary globe, see ASTRONOMY, n° 320.

For the equation of time, see ASTRONOMY, n° 181.

43
Solution of
several problems by an
analemma.

Most of the above problems may also be performed by means of accurate maps; but this requires a great deal of calculation, which is often very troublesome. The Analemma, or Orthographic Projection, delineated on 2^d Plate CXVI. will solve many of the most curious; and with the assistance of the maps will be almost equivalent to a terrestrial globe. The parallel lines drawn on this figure represent the degrees of the sun's declination from the equator, whether north or south, amounting to 23½ nearly. On these lines are marked the months and days which correspond to such and such declinations. The size of the figure does not admit of having every day of the year inserted; but by making allowance for the intermediate days, in proportion to the rest, the declination may be guessed at with tolerable exactness. The elliptical lines are designed to shew the hours of sun-rising or sun-setting before or after six o'clock. As 60 minutes make an hour of time, a fourth part of the space between each of the hour-lines will represent 15 minutes; which the eye can readily guess at, and which is as great exactness as can be expected from any mechanical invention,

or as is necessary to answer any common purpose. The circles drawn round the centre at the distance of 11½ each, shew the point of the compass on which the sun rises and sets, and on what point the twilight begins and ends.

In order to make use of this analemma, it is only necessary to consider, that, when the latitude of the place and the sun's declination are both north or both south, the sun rises before six o'clock, between the east and the elevated pole; that is, towards the north, if the latitude and declination are north; or towards the south, if the latitude and declination are south. Let us now suppose it is required to find the time of the sun's rising and setting, the length of the days and nights, the time when the twilight begins and ends, and what point of the horizon the sun rises and sets on, for the Lizard point in England, Frankfort in Germany, or Abbeville in France, on the 30th of April. The latitude of these places by the maps will be found nearly 50° north. Place the moveable index so that its point may touch 50° on the quadrant of north latitude in the figure; then observe where its edge cuts the parallel line on which April 30th is wrote. From this reckon the hour-lines towards the centre, and you will find that the parallel-line is cut by the index nearly at the distance of one hour and 15 minutes. So the sun rises at one hour fifteen minutes before six, or 45 minutes after four in the morning, and sets 15 minutes after seven in the evening. The length of the day is 14 hours 30 minutes. Observe how far the intersection of the edge of the index with the parallel of April 30th is distant from any of the concentric circles; which you will find to be a little beyond that marked *two points of the compass*; and this shews, that on the 30th of April the sun rises two points and somewhat more from the east towards the north, or a little to the northward of E. N. E. and sets a little to the northward of W. N. W. To find the beginning and ending of twilight, take from the graduated arch of the circle 17½ degrees with a pair of compasses; move one foot of the compasses extended to this distance along the parallel for the 30th of April, till the other joint touches the edge of the index, which must fill point at 50. The place where the other foot rests on the parallel of April 30th, then denotes the number of hours before six at which the twilight begins. This is somewhat more than three hours and an half; which shews, that the twilight then begins soon after two in the morning, and likewise that it begins to appear near five points from the east towards the north. The uses of this analemma may be varied in a great number of ways; but the example just now given will be sufficient for the ingenious reader.—The small circles on the same plate, marked *Island, Promontory, &c.* are added in order to render the maps more intelligible, by shewing how the different subjects are commonly delineated on them.

HAVING thus explained the use of the globes, and general principles of geography, we must refer to the maps for the situation of each particular country, with regard to longitude, latitude, &c. and to the names of the countries as they occur in the order of the alphabet, for the most remarkable particulars concerning them.

GEOMETRY,

PRINCIPLES
and
PRACTICE







DENMARK,
NORWAY,
SWEDEN,
and
FINLAND.



N O R W E G I A

P O L A N D

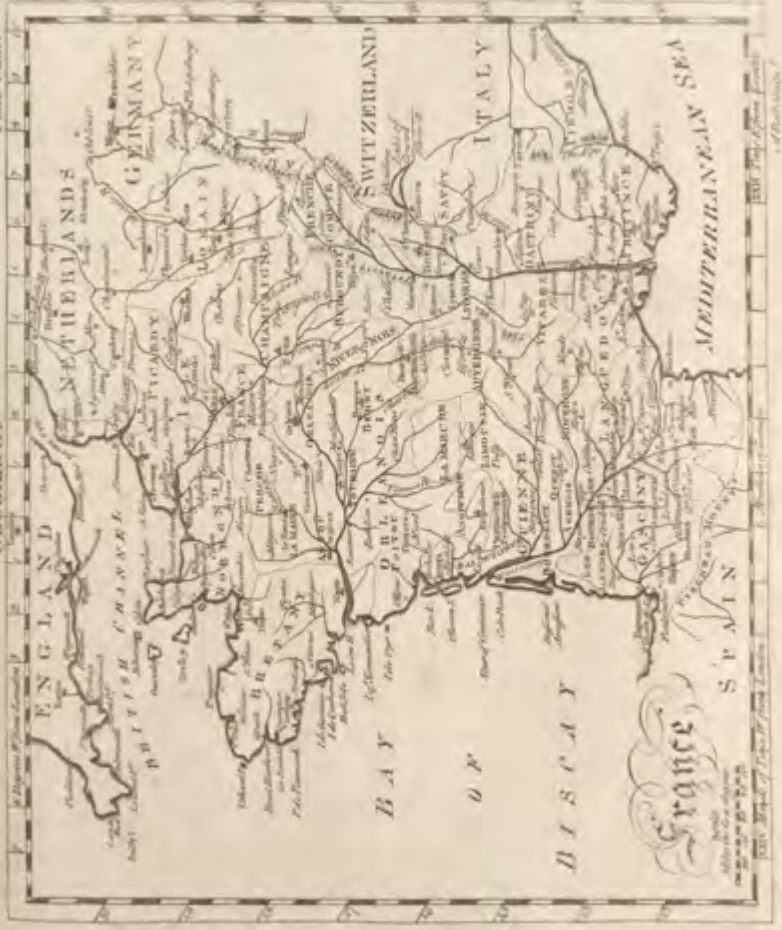
N O R W E G I A





























Degrees E. from London 75

PERSIA

MOGUL

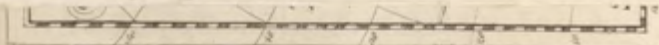
GUZURAT

DEKAN

MALDIVIA ISLANDS

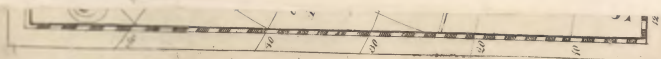
IND

V. H.





Lat. E. from London









G E O M E T R Y

ORIGINALLY signified no more than the art of measuring the earth, or any distances or dimensions within it: but at present it denotes the science of magnitude in general; comprehending the doctrine and relations of whatever is susceptible of augmentation or diminution, considered in that light.

Hence to geometry may be referred the consideration not only of lines, surfaces, and solids; but also of time, velocity, number, weight, &c.

This science had its rise among the Egyptians, who were in a manner compelled to invent it, to remedy confusion which generally happened in their lands, from the inundations of the river Nile, which carried away all boundaries, and effaced all the limits of their possessions. Thus this invention, which at first consisted only in measuring the lands, that every person might have what belonged to him, was called *geometry*, or the art of measuring land; and it is probable that the draughts and schemes, which they were annually compelled to make, helped them to discover many excellent properties of these figures; which speculations continued to be gradually improved, and are so to this day.

From Egypt geometry passed into Greece; where it continued to receive new improvements in the hands of Thales, Pythagoras, Archimedes, Euclid, &c. The Elements of Geometry, written by this last in 15 books, are a most convincing proof to what perfection this science was carried among the ancients. However, it must be acknowledged, that it fell short of modern geometry; the bounds of which, what by the invention of fluxions, and the discovery of the almost infinite orders of curves, are greatly enlarged.

We may distinguish the progress of geometry into three ages; the first of which was in its meridian glory at the time when Euclid's Elements appeared; the second, beginning with Archimedes, reaches to the time of Des Cartes, who, by applying algebra to the elements of geometry, gave a new turn to this science, which has been carried to its utmost perfection by Sir Isaac Newton and Mr Leibnitz.

In treating this useful subject, we shall divide it into two parts; the first containing the general principles; and the second, the application of these principles to the mensuration of surfaces, solids, &c.

P A R T I.

GENERAL PRINCIPLES OF GEOMETRY.

Art. 1. A Point is that which is not made up of parts, or which is of itself indivisible.

2. A line is a length without breadth, as B—

3. The extremities of a line are points; as the extremities of the line AB, are the points A and B, fig. 1.

4. If the line AB be the nearest distance between its extremes A and B, then it is called a *strait line*, as AB; but if it be not the nearest distance, then it is called a *curve line*, as a b, fig. 1.

5. A surface is that which is considered as having only length and breadth, but no thickness, as fig. 2.

6. The terms or boundaries of a surface are lines.

7. A plain surface is that which lies equally between its extremes.

8. The inclination between two lines meeting one another, (provided they do not make one continued line), or the opening between them, is called an *angle*; thus the inclination of the line AB to the line CB (fig. 3.) meeting one another at B, or the opening between the two lines AB and CB, is called an *angle*.

9. When the lines forming the angle are right lines, then it is called a *right-lined angle*, as fig. 4.; if one of them be right and the other curved, it is called a *mixed angle*, as fig. 5.; if both of them be curved it is called a *curve-lined angle*, as fig. 6.

10. If a right line AB fall upon another DC, (fig. 7.) so as to incline neither to one side nor to the other; but make the angles ABD, ABC, on each side equal to one another; then the line AB is said to be *perpendicular* to the line DC, and the two angles are called *right-angles*.

11. An obtuse angle is that which is greater than a right one, as fig. 8.; and an acute angle, that which is less than a right one, as fig. 9.

12. If a right line DC be fastened at one of its ends C, and the other end D be carried quite round, then the space comprehended is called a *circle*; the curve-line described by the point D, is called the *periphery* or *circumference* of the circle; the fixed point C is called the *centre* of it; fig. 10.

13. The describing line CD is called the *radius*, viz. any line drawn from the centre to the circumference; whence all radii of the same or equal circles are equal.

14. Any line drawn through the centre, and terminated both ways by the circumference, is called a *diameter*, as BD is a diameter of the circle BADE. And the diameter divides the circle and circumference into two equal parts, and is double the radius.

15. The circumference of every circle is supposed to be divided into 360 equal parts, called *degrees*; and each degree is divided into 60 equal parts, called *minutes*; and each minute into 60 equal parts, called *seconds*; and these into *thirds*, *fourths*, &c. these parts being greater or less according as the radius is.

16. Any part of the circumference is called an *arc*, or *arc*; and is called an arc of as many degrees as it contains parts of the 360, into which the circumference was divided: thus if AD be the $\frac{1}{4}$ of the circumference, then the arc AD is an arc of 45 degrees.

17. A line drawn from one end of an arc to the other, is called a *chord*, and is the measure of the arc: (a) thus

thus the right line AB is the chord of the arc ADB, fig. 11.

18. Any part of a circle cut off by a chord, is called a *segment*; thus the space comprehended between the chord AB and circumference ADB (which is cut off by the chord AB) is called a *segment*. Whence it is plain,

1st, That all chords divide the circle into two segments.

2^{dly}, The less the chord is, the more unequal are the segments, and *e contra*.

3^{dly}, When the chord is greatest, *viz.* when it is a diameter, then the segments are equal, *viz.* each a semicircle.

19. Any part of a circle (less than a semicircle) contained between two radii and an arc, is called a *sector*; thus the space contained between the two radii, AC, BC, and the arc AB, is called the sector, fig. 12.

20. The right line of any arc, is a line drawn perpendicular from one end of the arc, to a diameter drawn through the other end of the same arc; thus (fig. 13.) AD is the right line of the arc AB, it being a line drawn from A, the one end of the arc AB, perpendicular to CB, a diameter passing through B, the other end of the arc AB.

Now the lines standing on the same diameter, still increase till they come to the centre, and then becoming the radius, it is plain that the radius EC is the greatest possible sine, and for that reason it is called the *whole sine*.

Since the whole line EC must be perpendicular to the diameter FB (by def. 20.), therefore producing the diameter EG, the two diameters FB, EG, must cross one another at right angles, and so the circumference of the circle must be divided by them into four parts, EB, BG, GF, and FE, and these four parts are equal to one another (by def. 10.), and so EB a quadrant, or fourth part of the circumference; therefore the radius EC is always the sine of the quadrant, or fourth part of the circle EB.

Sines are said to be of so many degrees, as the arc contains parts of the 360, into which the circumference is supposed to be divided; so the radius being the sine of a quadrant, or fourth part of the circumference, which contains 90 degrees (the fourth part of 360), therefore the radius must be the sine of 90 degrees.

21. The part of the radius comprehended between the extremity of the right sine and the lower end of the arc, *viz.* DB, is called the *versed sine* of the arc AB.

22. If to any point in the circumference, *viz.* B, there be drawn a diameter FCB, and from the point B, perpendicular to that diameter, there be drawn the line BH; that line is called a *tangent* to the circle in the point B; which tangent can touch the circle only in one point B, else if it touched it in more, it would go within it, and so not be a tangent but a chord, (by art. 17.)

23. The tangent of any arc AB, is a right line drawn perpendicular to a diameter through the one end of the arc B, and terminated by a line CAH, drawn from the centre through the other end A; thus BH is the tangent of the arc AB.

24. And the line which terminates the tangent, *viz.* CH, is called the *secant* of the arc AB.

25. What an arc wants of a quadrant is called the *complement* of that arc; thus AE, being what the arc AB wants of the quadrant EB, is called the complement of the arc AB.

26. And what an arc wants of a semicircle is called the *supplement* of that arc; thus since AF is what the arc AB wants of the semicircle BAF, it is the supplement of the arc AB.

27. The sine, tangent, &c. of the complement of any arc, is called the *co-sine*, *co-tangent*, &c. of that arc; thus the sine, tangent, &c. of the arc AE is called the *co-sine*, *co-tangent*, &c. of the arc AB.

28. The sine of the supplement of an arc is the same with the sine of the arc itself; for, drawing them according to the definitions, there results the self-same line.

29. A right-lined angle is measured by an arc of a circle described upon the angular point as a centre, comprehended between the two legs that form the angle; thus (fig. 14.) the angle ABD is measured by the arc AD of the circle CADE that is described upon the point B as a centre; and the angle is said to be of as many degrees as the arc is; so if the arc AD be 45 degrees, then the angle ABD is said to be an angle of 45 degrees.

Hence the angles are greater or less, according as the arc described about the angular point and terminated by the two legs contain a greater or a less number of degrees.

30. When one line falls perpendicularly on another, as AB on CD, fig. 15, then the angles are right (by the 10th def.); and describing a circle on the centre B, since the angles ABC ABD are equal, their measures must be so too, *i. e.* the arcs AC AD must be equal; but the whole CAD is a semicircle, since CD, a line passing through the centre B, is a diameter; therefore each of the parts AC AD is a quadrant, *i. e.* 90 degrees; so the measure of a right angle is always 90 degrees.

31. If one line AB fall any way upon another, CD, then the sum of the two angles ABC ABD is always equal to the sum of two right angles; fig. 16. For on the point B, describing the circle CAD, it is plain, that CAD is a semicircle (by the 14th); but CAD is equal to CA and AD the measure of the two angles; therefore the sum of the two angles is equal to a semicircle, that is, to two right angles, (by the last).

Cor. 1. From whence it is plain, that all the angles which can be made from a point in any line, towards one side of the line, are equal to two right angles.

2. And that all the angles which can be made about a point, are equal to four right ones.

32. If one line AC cross another BD in the point E, then the opposite angles are equal, *viz.* BEA to CED, and BEC equal to AED; fig. 17. For upon the point E, as a centre, describing the circle ABCD, it is plain ABC is a semicircle, as also BCD (by the 14th); therefore the arc ABC is equal to the arc BCE; and from both taking the common arc BC, there will remain AB equal to CD, *i. e.* the angle BEA equal to the angle CED (by art. 29.) After the same manner

manner we may prove, that the angle BEC is equal to the angle AED.

33. Lines which are equally distant from one another, are called *parallel lines*; as AB, CD, fig. 18.

34. If a line GH cross two parallels AB, CD, (fig. 19.) then the external opposite angles are equal, *viz.* GEB equal to CFH, and AEG equal to HFD. For since AB and CD are parallel to one another, they may be considered as one broad line, and GH crossing it; then the vertical or opposite angles GEB CFH are equal (by art. 32.), as also AEG and HFD by the same.

35. If a line GH cross two parallels AB CD, then the alternate angles, *viz.* AEF and EFD, or CFE and FEB, are equal; that is, the angle AEF is equal to the angle EFD, and the angle CFE is equal to the angle FEB, for GEB is equal to AEF (by art. 32.), and CFH is equal to EFD (by the same); but GEB is equal to CFH (by the last); therefore AEF is equal to EFD. The same way we may prove FEB equal to EFC.

36. If a line GH cross two parallel lines AB, CD, then the external angle GEB is equal to the internal opposite one EFD, or GEA equal to CFE. For the angle AEF is equal to the angle EFD (by the last); but AEF is equal to GEB (by art. 32.), therefore GEB is equal to EFD. The same way we may prove AEG equal to CFE.

37. If a line GH cross two parallel lines AB, CD, then the sum of the two internal angles, *viz.* BEF and DFE, or AEF and CFE, are equal to two right angles; for since the angle GEB is equal to the angle EFD (by art. 36.), to both add the angle FEB, then GEB and BEF are equal to BEF and DFE; but GEB and BEF are equal to two right angles (by art. 31.), therefore BEF and DFE are also equal to two right angles. The same way we may prove that AEF and CFE are equal to two right angles.

38. A figure is any part of space bounded by lines or a line. If the bounding lines be straight, it is called a *rectilinear figure*, as fig. 20. if they be curved, it is called a *curvilinear figure*, as fig. 21. and fig. 22.; if they be partly curve lines and partly straight, it is called a *mixt figure*, as fig. 23.

39. The most simple rectilinear figure is that which is bounded by three right lines, and is called a *triangle*, as fig. 24.

40. Triangles are divided into different kinds, both with respect to their sides and angles: with respect to their sides they are commonly divided into three kinds, *viz.*

41. A triangle having all its three sides equal to one another, is called an *equilateral triangle*, as fig. 25.

42. A triangle having two of its sides equal one another, and the third side not equal to either of them, is called an *Isosceles triangle*, as fig. 26.

43. A triangle having none of its sides equal to one another, is called a *scalene triangle*, as fig. 27.

44. Triangles, with respect to their angles, are divided in three different kinds, *viz.*

45. A triangle having one of its angles right, is called a *right-angled triangle*, as fig. 28.

46. A triangle having one of its angles obtuse, or greater than a right angle, is called an *obtuse-angled triangle*, as fig. 29.

47. Lastly, a triangle having all its angles acute, is called an *acute-angled triangle*, as fig. 30.

48. In all right-angled triangles, the sides comprehending the right angle are called the *legs*, and the side opposite to the right angle is called the *hypotenuse*. Thus in the right-angled triangle ABC, fig. 31. (the right angle being at B) the two sides AB and BC, which comprehend the right angle ABC, are the legs of the triangle; and the side AC, which is opposite to the right angle ABC, is the hypotenuse of the right-angled triangle ABC.

49. Both obtuse and acute angled triangles are in general called *oblique-angled triangles*; in all which any side is called the *base*, and the other two the *sides*.

50. The perpendicular height of any triangle is a line drawn from the vertex to the base perpendicularly; thus if the triangle ABC (fig. 32.) be proposed, and BC be made its base, then A will be the vertex, *viz.* the angle opposite to the base; and if from A you draw the line AD perpendicular to BC, then the line AD is the height of the triangle ABC standing on BC as its base.

Hence all triangles standing between the same parallels have the same height, since all the perpendiculars are equal by the nature of parallels.

51. A figure bounded by four sides is called a *quadrilateral* or *quadrangular figure*, as ABDC, fig. 33.

52. Quadrilateral figures whose opposite sides are parallel, are called *parallelograms*. Thus in the quadrilateral figure ABDC, if the side AC be parallel to the side BD which is opposite to it, and AB be parallel to CD, then the figure ABDC is called a parallelogram.

53. A parallelogram having all its sides equal and angles right, is called a *square*, as fig. 34.

54. That which hath only the opposite sides equal and its angles right, is called a *rectangle*, as fig. 35.

55. That which hath equal sides but oblique angles, is called a *rhombus*, as fig. 36. and is just an inclined square.

56. That which hath only the opposite sides equal and the angles oblique, is called a *rhomboides*, as fig. 37. and may be conceived as an inclined rectangle.

57. When none of the sides are parallel to another, then the quadrilateral figure is called a *trapezium*.

58. Every other right lined figure, that has more sides than four, is in general called a *polygon*. And figures are called by particular names according to the number of their sides, *viz.* one of five sides is called a *pentagon*, of six a *hexagon*, of seven a *heptagon*, and so on. When the sides forming the polygon are equal to one another, the figure is called a regular figure or polygon.

59. In any triangle ABC (fig. 38.) one of its legs, as BC, being produced towards D, the external angle ACD is equal to both the internal opposite ones taken together, *viz.* to ABC and BAC. In order to prove this, through C, draw CE parallel to AB; then since CE is parallel to AB, and the lines AC and BD crosseth them, the angle ECD is equal to ABC (by art. 36.) and the angle ACE equal to CAB (by art. 35.); therefore the angles ECD and ECA are equal to the angles ABC and CAB; but the angles ECD and ECA are together

gether equal to the angle ACD ; therefore the angle ACD is equal to both the angles ABC and CAB taken together.

Cor. Hence it may be proved, that if two lines AB and CD (fig. 39.) be crossed by a third line EF , and the alternate angles AEF and EFD be equal, the lines AB and CD will be parallel; for if they are not parallel, they must meet one another on one side of the line EF (suppose at G) and fo form the triangle EFG , one of whose sides GE being produced to A , the exterior angle AEF must (by this article) be equal to the sum of the two angles EFG and EGF ; but, by supposition, it is equal to the angles EFG alone; therefore the angle AEF must be equal to the sum of the two angles EFG and EGF , and at the same time equal to the angle EFG alone, which is absurd; fo the lines AB and CD cannot meet, and therefore must be parallel.

60. *In any triangle ABC, all the three angles taken together are equal to two right angles.* To prove this, you must produce BC , one of its legs, to any distance, suppose to D ; then by the last proposition, the external angle, ACD , is equal to the sum of the two internal opposite ones CAB and ABC ; to both add the angle ACB , then the sum of the angles ACD and ACB will be equal to the sum of the angles CAB and CBA and ACB . But the sum of the angles ACD and ACB , is equal to two right ones (by art. 32.), therefore the sum of the three angles CAB and CBA and ACB , is equal to two right angles; that is, the sum of the three angles of any triangle ACB is equal to two right angles.

Cor. 1. Hence in any triangle given, if one of its angles be known, the sum of the other two is also known: for since (by the last) the sum of all the three is equal to two right angles, or a semicircle, it is plain, that taking any one of them from a semicircle or 180 degrees, the remainder will be the sum of the other two. Thus (in the former triangle ABC) if the angle ABC be 40 degrees, by taking 40 from 180 we have 140 degrees; which is the sum of the two angles BAC , ACB : the converse of this is also plain, viz. the sum of any two angles of a triangle being given, the other angle is also known by taking that sum from 180 degrees.

2. In any right-angled triangle, the two acute angles must just make up a right one between them; consequently, any one of the oblique angles being given, we may find the other by subtracting the given one from 90 degrees, which is the sum of both.

61. If in any two triangles, ABC (fig. 40.) DEF (fig. 41.) two legs of the one, viz. AB and AC , be equal to two legs of the other, viz. to DE and DF , each to each respectively, i. e. AB to DE and AC to DF ; and if the angles included between the equal legs be equal, viz. the angle BAC equal to the angle EDF ; then the remaining leg of the one shall be equal to the remaining leg of the other, viz. BC to EF ; and the angles opposite to equal legs shall be equal, viz. ABC equal to DEF (being opposite to the equal legs AC and DF), also ACB equal to DFE (which are opposite to the equal legs AB and DE). For if the triangle ABC be supposed to be lifted up and put upon the triangle DEF , and the point A on the point D ; it is plain, since BA and DE are of equal

length, the point E will fall upon the point B ; and since the angles BAC EDF are equal, the line AC will fall upon the line DF ; and they being of equal length, the point C will fall upon the point F ; and so the line BC will exactly agree with the line EF , and the triangle ABC will in all respects be exactly equal to the triangle DEF ; and the angle ABC will be equal to the angle DEF , also the angle ACB will be equal to the angle DFE .

Cor. 1. After the same manner it may be proved, that if in any two triangles ABC , DEF , (see the preceding figure) two angles ABC and ACB of the one, be equal to two angles DEF and DFE of the other, each to each respectively, viz. the angle ABC to the angle DEF , and the angle ACB equal to the angle DFE , and the sides included between these angles be also equal, viz. BC equal to EF , then the remaining angles and the sides opposite to the equal angles, will also be equal each to each respectively; viz. the angle BAC equal to the angle EDF , the side AB equal to DE , and AC equal to DF : for if the triangle ABC be supposed to be lifted up and laid upon the triangle DEF , the point B being put upon the point E , and the line BC upon the line EF , since BC and EF are of equal lengths, the point C will fall upon the point F , and since the angle ACB is equal to the angle DFE , the line CA will fall upon the line FD , and by the same way of reasoning the line BA will fall upon the line ED ; and therefore the point of intersection of the two lines BA and CA , viz. A , will fall upon the point of intersection of the two lines ED and FD , viz. D , and consequently BA will be equal to ED , and AC equal to DF , and the angle BAC equal to the angle EDF .

Cor. 2. It follows likewise from this article, that if any triangle ABC (fig. 42.) has two of its sides AB and AC equal to one another, the angles opposite to these sides will also be equal, viz. the angles ABC equal to the angle ACB . For suppose the line AD , bisecting the angle BAC , or dividing it into two equal angles BAD and CAD , and meeting BC in D , then the line AD will divide the whole triangle BAC into two triangles ABD and DAC ; in which BA and AD two sides of the one, are equal to CA and AD two sides of the other. each to each respectively, and the included angles BAD and DAC are by supposition equal; therefore (by this article) the angle ABC must be equal to the angle ACB .

62. *Any angle, as BAD (fig. 43.) at the circumference of a circle $BAD E$, is but half the angle BCD at the centre standing on the same arch $B E D$.* To demonstrate this, draw through A and the centre C , the right line ACE , then the angle ECD is equal to both the angles DAC and ADC (by art. 59.); but since AC and CD are equal (being two radii of the same circle) the angles subtended by them must be equal also, (by art. 62. cor. 2.) i. e. the angle CAD equal to the angle CDA ; therefore the sum of them is double any one of them, i. e. DAC and ADC is double of CAD , and therefore ECD is also double of DAC : the same way it may be proved, that ECB is double of CAB ; and therefore the angle BCD is double of the angle BAD , or BAD the half of BCD , which was to be proved.

Cor. 1. Hence an angle at the circumference is measured by half the arc it subtends; for the angle at the centre (standing on the same arc) is measured by the whole arc (by art. 29.); but since the angle at the centre is double that at the circumference, it is plain the angle at the circumference must be measured by only half the arc it stands upon.

Cor. 2. Hence all angles, $\angle ACB$, $\angle ADB$, $\angle AEB$, &c. (fig. 44.) at the circumference of a circle, standing on the same chord AB , are equal to one another; for by the last corollary they are all measured by the same arc, viz. half the AB which each of them subtends.

Cor. 3. Hence an angle in a segment greater than a semicircle is less than a right angle; thus, if $\angle ADB$ be a segment greater than a semicircle, (see the last figure) than the arc AB , on which it stands, must be less than a semicircle, and the half of it less than a quadrant or a right angle; but the angle $\angle ADB$ in the segment is measured by the half of AB , therefore it is less than a right angle.

Cor. 4. An angle in a semicircle is a right angle. For since $\angle ABD$ (fig. 46.) is a semicircle, the arc AED must also be a semicircle: but the angle $\angle ABD$ is measured by half the arc AED , that is, by half a semicircle or quadrant; therefore the angle $\angle ABD$ is a right one.

Cor. 5. Hence an angle in a segment less than a semicircle, as $\angle ABD$, (fig. 45.) is greater than a right angle: for since the arc ABD is less than a semicircle, the arc AED must be greater than a semicircle, and so it is half greater than a quadrant, i. e. than the measure of a right angle; therefore the angle $\angle ABD$, which is measured by half the arc AED , is greater than a right angle.

62. If from the centre C of the circle ABE , (fig. 47.) there be let fall the perpendicular CD on the chord AB , then that perpendicular will bisect the chord AB in the point D . To demonstrate this, draw from the centre to the extremities of the chord the two lines CA , CB ; then since the lines CA and CB are equal, the angles $\angle CAB$, $\angle CBA$, which they subtend must be equal also, (by art. 62. cor. 2.) but the perpendicular CD divides the triangle ACB into two right-angled triangles ACD and CDB , in which the sum of the angles $\angle ACD$ and $\angle CAD$ in the one, is equal to the sum of the angles $\angle DCB$ and $\angle CBD$ in the other, each being equal to a right angle, (by cor. 2. of art. 61.) but $\angle CAD$ is equal to $\angle CBD$, therefore $\angle ACD$ is equal to $\angle DCB$. So in the two triangles ACD and CBD , the two legs AC and CD in the one, are equal to the two legs BC and CD in the other, each to each respectively, and the included angles $\angle ACD$ and $\angle DCB$ are equal; therefore the remaining legs AD and BD are equal (by art. 61.) and consequently AB bisected in D .

64. If from the centre C of a circle ABE , there be drawn a perpendicular CD on the chord AB , and produced till it meet the circle in F , then the line CF bisects the arch AB in the point F ; for (see the foregoing figure) joining the points A and F , F and B by the straight lines AF , FB , then in the triangles ADF , BDF , AD is equal to BD (by art. 62.) and DF common to both; therefore AD and DF , two legs of the triangle ADF , are equal to BD and DF , two legs of the triangle BDF , and the included angles $\angle ADF$ $\angle BDF$

are equal, being both right; therefore (by art. 61.) the remaining legs AF and FB are equal; but in the same circle equal lines are chords of equal arches, therefore the arches AF and FB are equal. So the whole arch ABF is bisected in the point F by the line CF .

Cor. 1. From art. 63. it follows, that any line bisecting a chord at right angles is a diameter; for since (by art. 63.) a line drawn from the centre perpendicular to a chord, bisects that chord at right angles; therefore, conversely, a line bisecting a chord at right angles, must pass through the centre, and consequently be a diameter.

Cor. 2. From the two last articles it follows, that the sine of any arc is the half of the chord of twice the arc; for (see the foregoing scheme) AD is the sine of the arc AF , by the definition of a sine, and AF is half the arc ABF , and AD half the chord AB (by art. 63.); therefore the corollary is plain.

65. In any triangle, the half of each side is the sine of the opposite angle; for if a circle be supposed to be drawn through the three angular points A , B , and D of the triangle ABD , fig. 48. then the angle $\angle DAB$ is measured by half the arch BKD (by cor. 1. of art. 62.) but the half of BD , viz. BE , is the sine of half the arch BKD , viz. the sine of BK (by cor. 2. of the last) which is the measure of the angle $\angle BAD$; therefore the half of BD is the sine of the angle $\angle BAD$; the same way it may be proved, that the half of AD is the sine of the angle $\angle ABD$, and the half of AB is the sine of the angle $\angle ADB$.

66. The sine, tangent, &c. of any arch is called also the *sine*, *tangent*, &c. of the angle whose measure the arc is: thus because the arc GD (fig. 49.) is the measures of the angle $\angle GCD$; and since GH is the sine, DE the tangent, HD the versed sine, CE the secant, also GK the co-sine, BF the co-tangent, and CF the co-secant, &c. of the arch GD ; then GH is called the *sine*, DE the *tangent*, &c. of the angle $\angle GCD$, whose measure is the arch GD .

67. If two equal and parallel lines, AB and CD (fig. 50.) be joined by two others, AC and BD ; then these shall also be equal and parallel. To demonstrate this, join the two opposite angles A and D with the line AD ; then it is plain this line AD divides the quadrilateral, $ACDB$, into two triangles, viz. ABD , ACD , in which AB a leg of the one, is equal to DC a leg of the other, by supposition, and AD is common to both triangles; and since AB is parallel to CD , the angle $\angle BAD$ will be equal to the angle $\angle ADC$, (by art. 36.) therefore in the two triangles BA and AD , and the angle $\angle BAD$, is equal to $\angle ADC$ and DA , and the angle $\angle ADC$; that is, two legs and the included angle in the one, is equal to two legs and the included angle in the other; therefore (by art. 61.) BD is equal to AC , and since the angle $\angle DAC$ is equal to the angle $\angle ADB$, therefore the lines BD , AC are parallel (by cor. art. 59.)

Cor. 1. Hence it is plain, that the quadrilateral $ABDC$ is a parallelogram, since the opposite sides are parallel.

Cor. 2. In any parallelogram the line joining the opposite angles (called the *diagonal*) as AD , divides the figure into two equal parts, since it has been proved

ved that the triangles ABD ACD are equal to one another.

Cor. 3. It follows also, that a triangle ACD on the same base CD, and between the same parallels with a parallelogram ABDC, is the half of that parallelogram.

Cor. 4. Hence it is plain, that the opposite sides of a parallelogram are equal; for it has been proved, that ABDC being a parallelogram, AB will be equal to CD, and AC equal to BD.

68. All parallelograms on the same or equal bases, and between the same parallels, are equal to one another; that is, if BD and GH (fig. 51.) be equal, and the lines BH and AF be parallel, then the parallelograms ABDC, BDFE, and EFHG, are equal to one another. For AC is equal to EF, each being equal to BD, (by *cor. 4. of 67.*) To both add CE, then AE will be equal to CF. So in the two triangles ABE CDF, AB a leg of the one, is equal to CD a leg in the other; and AE is equal to CF, and the angle BAE is equal to the angle DCF (by art. 36.); therefore the two triangles ABE CDF are equal (by art. 61.); and taking the triangle CDE from both, the figure ABKC will be equal to the figure KDEF; to both which add the little triangle KBD, then the parallelogram ABDC will be equal to the parallelogram BDFE. The same way it may be proved, that the parallelogram EFHG is equal to the parallelogram EFDB; so the three parallelograms ABDC, BDFE, and EFHG will be equal to one another.

Cor. Hence it is plain, that triangles on the same base, and between the same parallels, are equal; since they are the half of the parallelograms on the same base and between the same parallels, (by *cor. 3. of last art.*)

69. In any right-angled triangle, ABC, (fig. 52.) the square of the hypotenuse BC, viz. BCMH, is equal to the sum of the squares made on the two sides AB and AC, viz. to ABDE and ACGF. To demonstrate this, through the point A draw AKL perpendicular to the hypotenuse BC, join AH, AM, CD, and BG; then it is plain that DB is equal to BA (by art. 53.); also BH is equal to BC (by the same); so in the two triangles DBC ABH, the two legs DB and BC in the one are equal to the two legs AB and BH in the other; and the included angles DBC and ABH are also equal; (for DBA is equal to CBH, being both right; to each add ABC, then it is plain that DBC is equal to ABH) therefore the triangles DBC ABH are equal (by art. 61.) but the triangle DBC is half of the square ABDE (by *cor. 3. of 67.*) and the triangle ABH is half the parallelogram BKLH (by the same), therefore half the square ABDE is equal to half the parallelogram BKLH. Consequently the square ABDE is equal to the parallelogram BKLH. The same way it may be proved, that the square ACGF is equal to the parallelogram CKML. So the sum of the squares ABDE and ACGF is equal to the sum of the parallelograms BKLH and CKML, but the sum of these parallelograms is equal to the square BCMH; therefore the sum of the squares on AB and AC is equal to the square on BC.

Cor. 1. Hence in a right-angled triangle, the hypotenuse and one of the legs being given, we may ea-

ily find the other, by taking the square of the given leg from the square of the hypotenuse, and the square root of the remainder will be the leg required.

Cor. 2. Hence, the legs in a right-angled triangle being given, we may find the hypotenuse, by taking the sum of the squares of the given legs, and extracting the square root of that sum.

70. If upon the line AB (fig. 53.) there be drawn a semicircle ADB, whose centre is C, and on the point C there be raised a perpendicular to the line AB, viz. CD; then it is plain the arc DB is a quadrant, or contains 90 degrees; suppose the arc DB to be divided into 9 equal arcs, each of which will contain 10 degrees, then on the point B raising BE perpendicular to the line AB, it will be a tangent to the circle in the point B, and if to every one of the divisions of the quadrant, viz. B 10, B 20, B 30, B 40, &c. you draw the sine, tangent, &c. (as in the scheme) we shall have the sine, tangent, &c. to every 10 degrees in the quadrant; and the same way we may have the sine, tangent, &c. to every single degree in the quadrant, by dividing it into 90 equal parts beginning from B, and drawing the sine, tangent, &c. to all the arcs beginning at the same point B. By this method they draw the lines of sines, tangents, &c. of a certain circle on the scale; for after drawing them on the circle, they take the length of them, and set them off in the lines drawn for that purpose. The same way, by supposing the radius of any number of equal parts, (suppose 1000, or 10,000, &c.) it is plain the sine, tangent, &c. of every arc must consist of some number of these equal parts, and by computing them in parts of the radius, we have tables of sines, tangents, &c. to every arc in the quadrant, called *natural sines, tangents, &c.* and the logarithms of these give us tables of logarithmic sines, tangents, &c. See LOGARITHMS.

71. In any triangle, ABC, (fig. 1.) if one of its sides, as AC, be bisected in E, (and consequently AC double of AE) and through E be drawn ED, parallel to BC, and meeting AB in D, then BC will be double of ED, and AB double of AD. Through D draw DF, parallel to AC, meeting BC in F: for since, by construction, DF is parallel to AC, and DE parallel to BC; therefore, (by art. 36.) the angle BFD will be equal to the angle BCA, (and by the same article) the angle BCA will be equal to the angle DEA, consequently the angle BFD will be equal to the angle DEA; also, (by art. 36.) the angle BDF will be equal to the angle DAE; and since DF is parallel to EC, and DE parallel to FC, the quadrilateral DFCE will be a parallelogram; and therefore, (by art. 59. *cor. 4.*) DF will be equal to EC, which, by construction, is equal to AE; so in the two triangles BDF DAE, the two angles BFD and BDF in the one, are equal to the two angles DEA and DAE in the other, each to each respectively; and the included side DF, is equal to the included side AE; therefore, (by art. 61. *cor. 1.*) AD will be equal to DB, and consequently AB double of AD; also (by the same) DE will be equal to BF; but DE is also (by art. 67. *cor. 4.*) equal to FC; therefore BF and ED together, or BC, will be double of DE.

After the same manner it may be proved, that if in the triangle AKG, (fig. 2.) AE be taken equal to a third

Geometry
Plates,
n^o II.

third part of AK, and through E be drawn ED, parallel to KG, and meeting AG in D; then ED will be equal to a third part of GK, and AD equal to a third part of AG.

Likewise if in any triangle ABC, (fig. 3.) upon the side AB, be taken AE, equal to one-fourth, one-fifth, one-sixth, &c. of AB, and through E be drawn ED parallel to BC and meeting AC in D; then DE will be one-fourth, one-fifth, one-sixth, &c. of BC, and AD the like part of AC; and, in general, if in any triangle ABC, there be assumed a point E on one of its sides AB, and through that point be drawn a line ED, parallel to one of its sides BC, and meeting the other side AC in D; then whatever part AE is of AB, the same part will ED be of BC, and AD of AC.

Cor. Hence it follows, that if in any triangle ABC, there be drawn ED, parallel to one of its sides BC, and meeting the other two in the points E and D, then $AE : AB :: ED : BC :: AD : AC$; that is, AE is to AB, as ED is to BC, and that as AD to AC.

72. If any two triangles ABC, fig. 4. a b c, fig. 5. are similar, or have all the angles of the one equal to all the angles of the other, each to each respectively; that is, the angle CAB equal to the angle c a b, and the angle ABC equal to the angle a b c, and the angle ACB equal to the angle a c b; then the legs opposite to the equal angles are proportioned, *viz.* $AB : ab :: AC : ac :: BC : bc$; and $AB : ab :: BC : bc :: AC : ac :: BC : bc$. On AB of the largest triangle set off AE equal to a b, and through E draw ED parallel to BC, meeting AC in D; then since DE and BC are parallel, and AB crossing them, the angle AED will (by art. 36.) be equal to the angle ABC, which (by supposition) is equal to the angle a b c, also the angle DAE is (by supposition) equal to the angle c a b; so in the two triangles AED, a b c, the two angles DAE AED of the one, are equal to two angles c a b a b c of the other, each to each respectively, and the included side AE is (by construction) equal to the included side ab; therefore, (by art. 61. cor. 1.) AD is equal to a c, and DE equal to c b; but since, in the triangle ABC, there is drawn DE parallel to BC one of its sides, and meeting the two other sides in the points D and E, therefore (by cor. art. 71.) $AB : AE :: AC : AD$, and $AB : AE :: BC : DE$, and $AC : AD :: BC : DE$; and in the three last proportions, instead of the lines AE, DE, and AD, putting in their equals a b, b c, and a c, we shall have $AB : ab :: AC : ac$, and $AB : ab :: BC : bc$, and lastly, $AC : ac :: BC : bc$.

73. The chord, sine, tangent, &c. of any arc in one circle, is to the chord, sine, tangent, &c. of the same arc in another, as the radius of the one is to the radius of the other, fig. 6, 6. Let ABD a b d be two circles, BD b d two arcs of these circles, equal to one another, or consisting of the same number of degrees; FD f d the tangents, BD b d the chords, BE b e the sines, &c. of these two arcs BD b d, and CD c d the radii of the circles; then say, $CD : c d :: FD : f d$, and $CD : c d :: BD : b d$, and $CD : c d :: BE : b e$, &c. For since the arcs BD b d are equal, the angles BCD b c d will be equal; and FD f d, being tangents to the points D and d, the angles CDF c d f will be equal, being each a right angle (art. 22.) so in the two triangles CDF c d f, the two angles FCD CDF of

the one, being equal to the two angles f c d c d f of the other, each to each, the remaining angle CFD, will be equal to the remaining angle c f d (by art. 60.); therefore the triangles CFD c f d are similar, and consequently (by art. 73.) $CD : c d :: FD : f d$. In the same manner it may be demonstrated, that $CD : c d :: BD : b d$, and $CD : c d :: BE : b e$, &c.

74. Let ABD (fig. 7.) be a quadrant of a circle described by the radius CD; BD any arc of it, and BA its complement; BG or CF the sine, CG or BF the co-sine; DE the tangent, and CE the secant of that arc BD. Then since the triangles CDE CGB are similar or equiangular, it will be (by art. 72.) $DE : EC :: GB : BC$, *i. e.* the tangent of any arc, is to the secant of the same, as the sine of it is to the radius. Also since $DE : EC :: GB : BC$; therefore, by inverting that proportion, we have $EC : DE :: BC : GB$, *i. e.* the secant is to the tangent, as the radius is to the sine of any arc.

Again, since the triangles CDE CGB are similar, therefore (by art. 72.) it will be $CD : CE :: CG : CB$, *i. e.* as the radius is to the secant of any arc, so is the co-sine of that arc to the radius. And by inverting the proportion we have this, *viz.* as the secant of any arc is to the radius, so is the radius to the co-sine of that arc.

75. In all circles the chord of 60 is always equal in length to the radius. Thus in the circle AEBD, (fig. 8.) if the arc AEB be an arc of 60 degrees, then drawing the chord AB, I say AB shall be equal to the radius CB or AC; for in the triangle ACB, the angle ACB is 60 degrees, being measured by the arc AEB; therefore the sum of the other two angles is 120 degrees, (by cor. 1. of 60.) but since AC and CB are equal, the two angles CAB, CBA will also be equal; consequently each of them half their sum 120, *viz.* 60 degrees; therefore all the three angles are equal to one another, consequently all the legs, therefore AB is equal to CB.

Cor. Hence the radius from which the lines on any scale are formed, is the chord of 60 on the line of chords.

Geometrical Problems.

PROB. I. From a point C (fig. 9.) in a given line AB to raise a perpendicular to that line.

Rule. From the point C take the equal distances CB, CA on each side of it. Then stretch the compasses to any distance greater than CB or CA, and with one foot of them in B, sweep the arc EF with the other; again, with the same opening, and one foot in A, sweep the arc GH with the other, and these two arcs will intersect one another in the point D; then join the given points C and D with the line CD, and that shall be the perpendicular required.

2. To divide a given right line AB (fig. 10.) into two equal parts; that is, to bisect it.

Rule. Take any distance with your compasses that you are sure is greater than half the given line; then setting one foot of them in B, with the other sweep the arc DFC; and with the same distance, and one foot in A, with the other sweep the arc CED; these two arcs will intersect one another in the points D, which joined by the right line DC will bisect AB in G.

3. From

3. From a given point D, (fig. 11.) to let fall a perpendicular on a given line AB.

Rule. Set one foot of the compasses in the point D, and extend the other to any distance greater than the least distance between the given point and the line, and with that extent sweep the arc AEB, cutting the line in the two points A and B, then (by the last prob.) bisect the line AB in the point C; lastly join C and D, and that line CD is the perpendicular required.

4. (Fig. 12.) Upon the end B of a given right line BA, to raise a perpendicular.

Rule. Take any extent in your compasses, and with one foot in B fix the other in any point C without the given line; then with one point of the compasses in C, describe with the other the circle EBD, and thro' E and C draw the diameter ECD meeting the circle in D; join D and B, and the right line DB is that required; for EBD is a right angle (by cor. 4. of 63.)

5. (Fig. 13.) To draw one line parallel to another given line AB, that shall be distant from one another by any given distance D.

Rule. Extend your compasses to the given distance D; then setting one foot of them in any point of the given line (suppose A,) with the other sweep the arc FCG; again, at the same extent, and one foot in any other point of the given line B, sweep the arc HDK, and draw the line CD touching them, and that will be parallel to the given line AB, and distant from it by the line D as was required.

6. (Fig. 14.) To divide a given line AB into any number of equal parts, suppose 7.

Rule. From the point A draw any line AD, making an angle with the line AB, then through the point B, draw a line BC parallel to AD; and from A, with any small opening of the compasses, set off a number of equal parts (on the line AD,) less by one than the proposed number (here 6.); then from B set off the same number of the same parts (on the line BC); lastly, join 6 and 1, 2 and 5, 3 and 4, 4 and 3, 5 and 2, 6 and 1, and these lines will cut the given line as required.

7. (Fig. 15.) To quarter a given circle, or to divide it into four equal parts.

Rule. Through the centre C of the given circle, draw a diameter AB, then upon the point C raise a perpendicular DCE to the line AB; and these two diameters AB and DE shall quarter the circle.

8. (Fig. 16.) Through three given points A, B, and D, to draw a circle. *Note.* The three points must not lie in the same straight line.)

Rule. Join A and B, also B and D, with the freight lines AB BD; then (by prob. 2.) bisect AB with the line EC, also BD with the line FC, which two lines will cut one another in some point C; that is the centre of the circle required: then fixing one point of your compasses in D, and stretching the other to A, describe the circle ABDC, which will pass through the three points given. The reason of this is plain from cor. 1. of art. 64.

9. (Fig. 17.) From the point A of the given line AB, to draw another line (suppose AC) that shall make with AB an angle of any number of degrees, suppose 45.

Rule. Let the given line AB be produced, then take off your scale the length of the chord of 60 degrees, which is equal to the radius of the circle the scale was made for (by art. 75.); and setting one foot in A, with the other sweep off the arc BC; then with your compasses take from your scale the chord of 45 degrees, and set off that distance from B to C. Lastly, join A and C, and the line AC is that required. For the angle CAB, which is measured by the arc BC, is an angle of 45 degrees, as was required.

10. An angle BAC (fig. 18.) being given, to find how many degrees it contains.

Rule. With your compasses take the length of your chord of 60 from your scale. Then, setting one foot of them in A, with the other sweep the arc BC, which is the arc comprehended between the two legs AB, AC produced if needful. Lastly, take with your compasses the distance BC, and applying it to your line of chords on the scale, you will find how many degrees the arc BC contains, and consequently the degrees of the angle BAC which was required.

11. Three lines x , y , and z being given, (fig. 19.) to form a triangle of them; but any two of these lines taken together must always be greater than the third.

Rule. Make any one of them, as x , the base; then with your compasses take another of them, as z , and setting one foot in one end of the line x , as B, with the other sweep the arc DE; and taking with your compasses the length of the other y , set one foot of them in A, the other end of the line x , and with the other sweep the arc FG, which will cut the other in C; lastly, join CA and CB, and the triangle CAB is that required.

12. To make a triangle, having one of its legs of any number of equal parts (suppose 160,) and one of the angles at that leg 50 degrees, and the other 44 degrees.

Rule. Draw an indefinite line ED, (fig. 20.) then take off the line of equal parts with your compasses, 160 of them, and set them on the indefinite line, as BC; then (by prob. 9.) draw BA, making the angle ABC of 50 degrees, and (by the same) draw from C the line AC, making the angle ACB of 44 degrees; which two lines will meet one another in A, and the triangle ABC is that required. See TRIGONOMETRY.

13. Upon a given line AB (fig. 21.) to make a square.

Rule. Upon the extremity A of the given line AB, raise a perpendicular AC (by prob. 4.); then take AC equal to AB, and with that extent, setting one foot of the compasses in C, sweep with the other foot the arc GH; then with the same extent, and one foot in B, with the other sweep the arc EF, which will meet the former in some point D; lastly, join C and D, D and B, and the figure ABDC will be the square required.

14. On a given line AB (fig. 22.) to draw a rhomb that shall have one of its angles equal to any number of degrees, suppose 60 degrees.

Rule. From the point A of the given line AB, draw the line AC, making the angle CAB of 60 degrees, (by prob. 9.) then take AC equal to AB, and with that extent, fixing one foot of the compasses in B,

B, with the other describe the arc GH; and at the same extent, fixing one foot of the compasses in C, with the other describe the arc EF cutting the former in D; lastly, join CD and DB, and the figure ACDB is that required.

15. Given two lines x and z , of these two to make a rectangle.

Rule. Draw a line, as AB, (fig. 23. 23.) equal in length to one of the given lines x ; and on the extremity A of that line, raise a perpendicular AC, on which take AC equal to the other line z ; then take with your compasses the length of the line AB, and at that extent, fixing one foot of them in C, with the other sweep the arc EF; and also taking with your compasses the extent of the line AC, fix one foot of them in B, and with the other sweep the arc GH,

which will meet the former in D; lastly, join CD and BD, and the figure ABDC will be that required.

16. Two lines x and z being given, of these to form a rhomboides that shall have one of its angles any number of degrees, suppose 50.

Rule. Draw a line AB (fig. 24. 24.) equal in length to one of the lines, as x ; then draw the line AC, making with the former the angle BAC equal to the proposed, suppose 50 degrees, and on that line take AC equal to the given line z ; then with your compasses take the length of AB, and fixing one foot in C, sweep the arc EF; also, taking the length of AC, and setting one foot in B, with the other sweep the arc GH, which will cut the former in D; then join CD and DB, so the figure ACDB will be that required.

P A R T II.

THE APPLICATION OF THE FOREGOING PRINCIPLES TO THE MENSURATION OF SURFACES, SOLIDS, &c.

CHAP. I. Of the Mensuration of Lines and Angles.

A Line, or length, to be measured, whether it be distance, height, or depth, is measured by a line less than it. With us the least measure of length is an inch: not that we measure no line less than it, but because we do not use the name of any measure below that of an inch; expressing lesser measures by the fractions of an inch: and in this treatise we use decimal fractions as the easiest. Twelve inches make a foot; three feet and an inch make the Scots ell; six ells make a fall; forty falls make a furlong; eight furlongs make a mile: so that the Scots miles is 1184 paces, accounting every pace to be five feet. These things are according to the statutes of Scotland; notwithstanding which, the glaziers use a foot of only eight inches; and other artists for the most part use an English foot, on account of the several scales marked on the English foot-measure for their use. But the English foot is somewhat less than the Scots; so that 185 of these make 186 of those.

Lines, to the extremities and any intermediate point of which you have easy access, are measured by applying to them the common measure a number of times. But lines, to which you cannot have such access, are measured by methods taken from geometry; the chief whereof we shall here endeavour to explain. The first is by the help of the geometrical square.

“As for the English measures, the yard is 3 feet, or 36 inches. A pole is sixteen feet and a half, or five yards and a half. The chain, commonly called *Gunter's chain*, is four poles, or 22 yards, that is, 66 feet. An English statute-mile is fourscore chains, or 1760 yards, that is, 5280 feet.

“The chain (which is now much in use, because it is very convenient for surveying) is divided into 100 links, each of which is $7\frac{1}{2}$ of an inch: whence it is easy to reduce any number of those links to feet, or any number of feet to links.

“A chain that may have the same advantages in

“surveying in Scotland, as Gunter's chain has in England, ought to be in length 74 feet, or 24 Scots ells, “if no regard is had to the difference of the Scots “and English foot above-mentioned. But, if regard “is had to that difference, the Scots chain ought to “consist of $74\frac{1}{2}$ English feet, or 74 feet 4 inches and “ $\frac{1}{2}$ of an inch. This chain being divided into 100 “links, each of those links is 8 inches and $\frac{2}{3}$ of “an inch. In the following table, the most noted “measures are expressed in English inches and decimals of an inch.”

English Inch. Dec.

The English foot, is	-	-	12	000
The Paris foot,	-	-	12	788
The Rhinland foot, measured by Mr Picart,	12	362		
The Scots foot,	-	-	12	065
The Amsterdam foot, by Snellius and Picart,	11	172		
The Dantzick foot, by Hevelius,	-	11	297	
The Danish foot, by Mr Picart,	-	12	465	
The Swedish foot, by the same,	-	11	692	
The Brussels foot, by the same,	-	10	828	
The Lyons foot, by Mr Auzout,	-	13	458	
The Bononian foot, by Mr Cassini,	-	14	938	
The Milan foot, by Mr Auzout,	-	15	631	
The Roman palm used by merchants, according to the same,	-	9	791	
The Roman palm used by architects,	8	779		
The palm of Naples, according to Mr Auzout,	10	314		
The English yard,	-	36	000	
The English ell,	-	45	000	
The Scots ell,	-	37	200	
The Paris aune used by mercers, according to Mr Picart,	-	46	786	
The Paris aune used by drapers, according to the same,	-	46	680	
The Lyons aune, by Mr Auzout,	-	46	570	
The Geneva aune,	-	44	760	
The Amsterdam ell,	-	26	800	
The Danish ell, by Mr Picart,	-	24	930	
	(b)			The

	<i>English Inch.</i>	<i>Dec.</i>
The Swedish ell,	23	380
The Norway ell,	24	510
The Brabant or Antwerp ell,	27	170
The Brussels ell,	27	260
The Burges ell,	27	550
The brace of Bononia, according to Auzont,	25	200
The brace used by architects in Rome,	30	730
The brace used in Rome by merchants,	34	270
The Florence brace used by merchants, according to Picart,	22	910
The Florence geographical brace,	21	570
The vara of Seville,	33	127
The vara of Madrid,	39	166
The vara of Portugal,	44	031
The cavedo of Portugal,	27	354
The ancient Roman foot,	11	632
The Persian arith, according to Mr Græves,	38	364
The shorter pike of Constantinople, according to the fame,	25	576
Another pike of Constantinople, according to Mess. Mallet and De la Porte,	27	920

PROPOSITION I.

PROB. To describe the structure of the geometrical square.—The geometrical square is made of any solid matter, as brals or wood, or of any four plain rulers joined together at right angles, (as in fig. 1.) where A is the centre, from which hangs a thread with a small weight at the end, so as to be directed always to the centre. Each of the sides BE and DE is divided into an hundred equal parts, or (if the sides be long enough to admit of it) into a thousand parts; C and F at two sights, fixed on the side AD. There is moreover an index GH, which, when there is occasion, is joined to the centre A, in such manner as that it can move round, and remain in any given situation. On this index are two sights perpendicular to the right line going from the centre of the instrument: these are K and L. The side DE of the instrument is called the upright side; E the reclining side.

PROPOSITION II.

FIG. 2. To measure an accessible height, AB, by the help of a geometrical square, its distance being known.—Let BR be an horizontal plane, on which there stands perpendicularly any line AB: let BD, the given distance of the observer from the height, be 96 feet; let the height of the observer's eye be supposed 6 feet: and let the instrument, held by a steady hand, or rather leaning on a support, be directed towards the summit A, so that one eye (the other being shut) may see it clearly through the sights; the perpendicular or plumb-line meanwhile hanging free, and touching the surface of the instrument: let now the perpendicular be supposed to cut off on the right side KN 80 equal parts. It is clear that LKN, ACK, are similar triangles; for the angles LKN, ACK are right angles, and therefore equal; moreover LN and AC are parallel, as being both perpendicular to the horizon; consequently, (by art. 60. cor. 1. Part I.) the angles KLN, KAC, are equal; wherefore, (by art. 60. cor. 2. of Part I.) the angles LNK, and AKC, are likewise equal: so that in the triangles NKL, KAC, (by art. 72. of Part I.) as NK : KL :: KC (i. e. BD)

: CA; that is, as 80 to 100, so is 96 feet to CA. Therefore, by the rule of three, CA will be found to be 120 feet; and CB, which is 6 feet, being added, the whole height is 126 feet.

But if the distance of the observer from the height, as BE, be such, that when the instrument is directed as formerly toward the summit A, the perpendicular falls on the angle P, opposite to H, the centre of the instrument, and BE or CG be given of 120 feet: CA will also be 120 feet. For in the triangles HGP, ACG, equiangular, as in the preceding case, as PG : GH :: GC : CA. But PG is equal to GH; therefore GC is likewise equal to CA: that is, CA will be 120 feet, and the whole height 126 feet as before.

Let the distance BF be 300 feet, and the perpendicular or plumb-line cut off 40 equal parts from the reclining side: Now, in this case, the angle, QAC, QZI, are equal, and the angles QZI, ZIS, are equal; therefore the angle ZIS is equal to the angle QAC. But the angles ZSI, QCA are equal, being right angles; therefore, in the equiangular triangles ACQ, SZI, it will be, as ZS : SI :: CQ : CA; that is, as 100 to 40, so is 300 to CA. Wherefore, by the rule of three, CA will be found to be of 102 feet. And, by adding the height of the observer, the whole BA will be 126 feet. Note, that the height is greater than the distance, when the perpendicular cuts the right side, and less if it cut the reclined side: and that the height and distance are equal, if the perpendicular fall on the opposite angle.

SCHOLIUM.

If the height of a tower, to be measured as above, end in a point, (as in fig. 3.) the distance of the observer opposite to it, is not CD, but is to be accounted from the perpendicular to the point A; that is, to CD must be added the half of the thickness of the tower, viz. BD: which must likewise be understood in the following propositions, when the case is similar.

PROPOSITION III.

FIG. 4. From the height of a tower AB given, to find a distance on the horizontal plane BC, by the geometrical square.—Let the instrument be so placed, as that the mark C in the opposite plane may be seen through the sights; and let it be observed how many parts are cut off by the perpendicular. Now, by what hath been already demonstrated, the triangles AEF, ABC, are similar; therefore, it will be as EF, to AE, so AB (composed of the height of the tower BG, and of the height of the centre of the instrument A, above the tower BG) to the distance BC. Wherefore, if, by the rule of three, you say, as EF to AE, so is AB to BC, it will be the distance sought.

PROPOSITION IV.

FIG. 5. To measure any distance at land or sea, by the geometrical square.—In this operation, the index is to be applied to the instrument, as was shown in the description; and, by the help of a support, the instrument is to be placed horizontally at the point A; then let it be turned till the remote point F, whose distance is to be measured, be seen through the fixed sights; and bring the index to be parallel with the other side of the instrument, observe by the sights upon it any accessible mark B, at a sensible distance: then carrying the instrument to the point B, let the immovable

moveable sights be directed to the first station A, and the sights of the index to the point F. If the index cut the right side of the square, as in K, in the two triangles BRK, and BAF, which are æquiangular, it will be as BR to RK, so BA (the distance of the stations to be measured with a chain) to AF; and the distance AF sought will be found by the rule of three. But if the index cut the reclined side of the square in any point L, where the distance of a more remote point is sought; in the triangles BLS, BAG, the side LS shall be to SB, as BA to AG, the distance sought; which accordingly will be found by the rule of three.

PROPOSITION V.

FIG. 6. *To measure an accessible height by means of a plain mirror.*—Let AB be the height to be measured; let the mirror be placed at C, in the horizontal plane BD, at a known distance BC; let the observer go back to D, till he see the image of the summit in the mirror, at a certain point of it, which he must diligently mark; and let DE be the height of the observer's eye. The triangles ABC and EDC are equiangular; for the angles at D and B are right angles; and ACB, ECD, are equal, being the angles of incidence and reflexion of the ray AC, as is demonstrated in optics; wherefore the remaining angles at A and E are also equal: therefore it will be, as CD to DE, so CB to BA; that is, as the distance of the observer from the point of the mirror in the right line betwixt the observer and the height, is to the height of the observer's eye, so is the distance of the tower from that point of the mirror, to the height of the tower sought; which therefore will be found by the rule of three.

Note 1. The observation will be more exact, if, at the point D, a staff be placed in the ground perpendicularly, over the top of which the observer may see a point of the glass exactly in a line betwixt him and the tower.

Note 2. In place of a mirror may be used the surface of water contained in a vessel, which naturally becomes parallel to the horizon.

PROPOSITION VI.

FIG. 7. *To measure an accessible height AB by means of two staffs.*—Let there be placed perpendicularly in the ground a longer staff DE, likewise a shorter one FG, so as the observer may see A, the top of the height to be measured, over the ends D F of the two staffs; let FH and DC, parallel to the horizon, meet DE and AB in H and C; then the triangles FHD, DCA, shall be equiangular; for the angles at C and H are right ones; likewise the angle A is equal to the angle FDH; wherefore the remaining angles DFH, and ADC, are also equal: wherefore, as FH, the distance of the staffs, to HD, the excess of the longer staff above the shorter; so is DC, the distance of the longer staff from the tower, to CA, the excess of the height of the tower above the longer staff. And thence CA will be found by the rule of three.

To which if the length DE be added, you will have the whole height of the tower BA.

S C H O L I U M.

FIG. 8. Many other methods may be occasionally contrived for measuring an accessible height. For example, from the given length of the shadow BD, to

find out the height AB, thus: Let there be erected a staff CE perpendicularly, producing the shadow EF: The triangles ABD, CEF, are equiangular; for the angles at B and E are right; and the angles ADB and CFE are equal, each being equal to the angle of the sun's elevation above the horizon: Therefore, as EF, the shadow of the staff, to EC, the staff itself; so BD, the shadow of the tower, to BA, the height of the tower. Though the plane on which the shadow of the tower falls be not parallel to the horizon, if the staff be erected in the same plane, the rule will be the same.

PROPOSITION VII.

To measure an inaccessible height by means of two staffs.—Hitherto we have supposed the height to be accessible, or that we can come at the lower end of it; now if, because of some impediment, we cannot get to a tower, or if the point whose height is to be found out be the summit of a hill, so that the perpendicular be hid within the hill; if, for want of better instruments, such an inaccessible height is to be measured by means of two staffs, let the first observation be made with the staffs DE and FG, (as in prop. 6.); then the observer is to go off in a direct line from the height and first station, till he come to the second station; where (fig. 11.) he is to place the longer staff perpendicularly at RN, and the shorter staff at KO, so that the summit A may be seen along their tops; that is, so that the points KNA may be in the same right line. Through the point N, let there be drawn the right line NP parallel to FA: Wherefore in the triangles KNP, KAF, the angles KNP, KAF are equal, also the angle AKF is common to both; consequently the remaining angle KPN is equal to the remaining angle KFA. And therefore, PN : FA :: KP : KF. But the triangles PNL, FAS are similar; therefore, PN : FA :: NL : SA. Therefore, (by the 11. 5. Eucl.) KP : KF :: N L : SA. Thence, alternately, it will be, as KP (the excess of the greater distance of the short staff from the long one above its lesser distance from it) to NL, the excess of the longer staff above the shorter; so KF, the distance of the two stations of the shorter staff to SA, the excess of the height sought above the height of the shorter staff. Wherefore SA will be found by the rule of three. To which let the height of the shorter staff be added, and the sum will give the whole inaccessible height BA.

Note 1. In the same manner may an inaccessible height be found by a geometrical square, or by a plain speculum. But we shall leave the rules to be found out by the student, for his own exercise.

Note 2. That by the height of the staff we understand its height above the ground in which it is fixed.

Note 3. Hence depends the method of using other instruments invented by geometricians; for example, of the geometrical cross; and if all things be justly weighed, a like rule will serve for it as here. But we incline to touch only upon what is most material.

PROPOSITION VIII.

FIG. 9. *To measure the distance AB, to one of whose extremities we have access, by the help of four staffs.*—Let there be a staff fixed at the point A; then going back at some sensible distance in the same right line, let another be fixed in C, so as that both the points A

and B be covered and hid by the staff C: likewise going off in a perpendicular from the right line CB, at the point A, (the method of doing which shall be shewn in the following *scholium*), let there be placed another staff at H; and in the right line CKG (perpendicular to the same CB, at the point B), and at the point of it K, such that the points K, H, and B may be in the same right line, let there be fixed a fourth staff. Let there be drawn, or let there be supposed to be drawn, a right line GH parallel to CA. The triangles KGH, HAB, will be equiangular; for the angles HAB KGH are right angles. Also the angles ABH, KHG are equal; wherefore, as KG (the excess of CK above AH) to GH, or to CA, the distance betwixt the first and second staff; so is AH, the distance betwixt the first and third staff, to AB the distance sought.

SCHOLIUM.

Fig. 10. To draw on a plane a right line AE perpendicular to CH, from a given point A; take the right lines AB, AD, on each side equal; and in the points B and D, let there be fixed stakes, to which let there be tied two equal ropes BE, DE, or one having a mark in the middle, and holding in your hand their extremities joined, (or the mark in the middle, if it be but one), draw out the ropes on the ground; and then, where the two ropes meet, or at the mark, when by it the rope is fully stretched, let there be placed a third stake at E; the right line AE will be perpendicular to CH in the point A (prob. i. of Part I.). In a manner not unlike to this, may any problems that are resolved by the square and compasses, be done by ropes and a cord turned round as a radius.

PROPOSITION IX.

FIG. 12. To measure the distance AB, one of whose extremities is accessible.—From the point A, let the right line AC of a known length be made perpendicular to AB, (by the preceding *scholium*): likewise draw the right line CD perpendicular to CB, meeting the right line AB in D: then as DA : AC :: AC : AB. Wherefore, when DA and AC are given, AB will be found by the rule of three.

SCHOLIUM.

All the preceding operations depend on the equality of some angles of triangles, and on the similarity of the triangles arising from that equality. And on the same principles depend innumerable other operations which a geometrician will find out of himself, as is very obvious. However, some of these operations require such exactness in the work, and without it are so liable to errors, that, *cæteris paribus*, the following operations, which are performed by a trigonometrical calculation, are to be preferred; yet could we not omit those above, being most easy in practice, and most clear and evident to those who have only the first elements of geometry. But if you are provided with instruments, the following operations are more to be relied upon. We do not insist on the easiest cases to those who are skilled in plain trigonometry, which is indeed necessary to any one who would apply himself to practice. See TRIGONOMETRY.

PROPOSITION X.

FIG. 13. To describe the construction and use of the geometrical quadrant.—The geometrical quadrant is

the fourth part of a circle divided into 90 degrees, to which two sights are adapted, with a perpendicular or plumb-line hanging from the centre. The general use of it is for investigating angles in a vertical plane, comprehended under right lines going from the centre of the instrument, one of which is horizontal, and the other is directed to some visible point. This instrument is made of any solid matter, as wood, copper, &c.

PROPOSITION XI.

FIG. 14. To describe and make use of the graphometer.—The graphometer is a semicircle made of any hard matter, of wood, for example, or brass, divided into 180 degrees; so fixed on a *fulcrum*, by means of a brass ball and socket, that it easily turns about, and retains any situation; two sights are fixed on its diameter. At the centre there is commonly a magnetical needle in a box. There is likewise a moveable ruler, which turns round the centre, and retains any situation given it. The use of it is to observe any angle, whose vertex is at the centre of the instrument in any plane, (though it is most commonly horizontal, or nearly so), and to find how many degrees it contains.

PROPOSITION XII.

FIG. 15, and 16. To describe the manner in which angles are measured by a quadrant or graphometer.—Let there be an angle in a vertical plane, comprehended between a line parallel to the horizon HK, and the right line RA, coming from any remarkable point of a tower or hill, or from the sun, moon, or a star. Suppose that this angle RAH is to be measured by the quadrant: let the instrument be placed in the vertical plane, so as that the centre A may be in the angular point: and let the sights be directed towards the object at R, (by the help of the ray coming from it, if it be the sun or moon, or by the help of the visual ray, if it is any thing else), the degrees and minutes in the arc BC cut off by the perpendicular, will measure the angle RAH required. For, from the make of the quadrant, BAD is a right angle; therefore BAR is likewise right, being equal to it. But, because HK is horizontal, and AC perpendicular, HAC will be a right angle; and therefore equal also to BAR. From those angles subtract the part HAB that is common to both; and there will remain the angle BAC equal to the angle RAH. But the arc BC is the measure of the angle BAC; consequently, it is likewise the measure of the angle RAH.

Note, That the remaining arc on the quadrant DC is the measure of the angle RAZ, comprehended between the forefaid right line RA and AZ which points to the zenith.

Let it now be required to measure the angle ACB (fig. 16.) in any plane, comprehended between the right lines AC and BC, drawn from two points A and B, to the place of station C. Let the graphometer be placed at C, supported by its *fulcrum* (as was shown above); and let the immovable sights on the side of the instrument DE be directed towards the point A; and likewise (while the instrument remains immovable) let the sights of the ruler FG (which is moveable about the centre C) be directed to the point B. It is evident that the moveable ruler cuts off an arc DH, which is the measure of the angle ACB sought.

Moreover,

Moreover, by the same method, the inclination of CE, or of FG, may be observed with the meridian line, which is pointed out by the magnetic needle inclosed in the box, and is moveable about the centre of the instrument, and the measure of this inclination or angle found in degrees.

PROPOSITION XIII.

FIG. 17. *To measure an accessible height by the geometrical quadrant.*—By the 12th prop. of this Part, let the angle C be found by means of the quadrant. Then in the triangle ABC, right-angled at B, (BC being supposed the horizontal distance of the observer from the tower), having the angle at C, and the side BC, the required height BA will be found by the 3^d case of plain trigonometry. See TRIGONOMETRY.

PROPOSITION XIV.

FIG. 18. *To measure an inaccessible height by the geometrical quadrant.*—Let the angle ACB be observed with the quadrant (by the 12th prop. of this Part); then let the observer go from C to the second station D, in the right line BCD (provided BCD be a horizontal plane); and after measuring this distance CD, take the angle ADC likewise with the quadrant. Then, in the triangle ADC, there is given the angle ADC, with the angle ACD; because ACB was given before: therefore (by art. 59. of Part I.) the remaining angle CAD is given likewise. But the side CD is likewise given, being the distance of the station C and D; therefore (by the first case of oblique-angled triangles in trigonometry) the side AC will be found. Wherefore, in the right-angled triangle ABC, all the angles and the hypotenuse AC are given; consequently, by the fourth case of trigonometry, the height sought AB will be found; as also (if you please) the distance of the station C, from AB the perpendicular within the hill or inaccessible height.

PROPOSITION XV.

FIG. 19. *From the top of a given height, to measure the distance BC.*—Let the angle BAC be observed by the 12th prop. of this; wherefore in the triangle ABC, right-angled at B, there is given by observation the angle at A; whence (by the 59th art. of Part I.) there will also be given the angle BCA: moreover the side AB (being the height of the tower) is supposed to be given. Wherefore, by the 3^d case of trigonometry, BC, the distance sought, will be found.

PROPOSITION XVI.

FIG. 20. *To measure the distance of two places A and B, of which one is accessible, by the graphometer.*—Let there be erected at two points A and C, sufficiently distant, two visible signs; then (by the 12th prop. of this Part) let the two angles BAC, BCA, be taken by the graphometer. Let the distance of the stations A and C be measured with a chain. Then the third angle B being known, and the side AC being likewise known; therefore, by the first case of trigonometry, the distance required, AB will be found.

PROPOSITION XVII.

FIG. 21. *To measure by the graphometer, the distance of two places, neither of which is accessible.*—Let two stations C and D be chosen, from each of which the places may be seen whose distance is sought; let the angles ACD, ACB, BCD, and likewise the angles BDC, BDA, CDA, be measured by the graphometer;

let the distance of the stations C and D be measured by a chain, or (if it be necessary) by the preceding practice. Now, in the triangle ACD, there are given two angles ACD and ADC; therefore, the third CAD is likewise given; moreover the side CD is given; therefore, by the first case of trigonometry, the side AD will be found. After the same manner, in the triangle BCD, from all the angles and one side CD given, the side BD is found. Wherefore, in the triangle ADB, from the given sides DA and DB, and the angle ADB contained by them, the side AB (the distance sought) is found by the 4th case of trigonometry of oblique-angled triangles.

PROPOSITION XVIII.

FIG. 22. *It is required by the graphometer and quadrant, to measure an accessible height AB, placed so on a steep, that one can neither go near it in an horizontal plane, nor recede from it, as we supposed in the solution of the 14th prop.*—Let there be chosen any situation as C, and another D; where let some mark be erected: let the angles ACD and ADC be found by the graphometer; then the third angle DAC will be known. Let the side CD, the distance of the stations, be measured with a chain, and thence (by trigonometry) the side AC will be found. Again, in the triangle ACB, right-angled at B, having found by the quadrant the angle ACB, the other angle CAB is known likewise: but the side AC in the triangle ADC is already known; therefore the height required AB will be found by the 4th case of right-angled triangles. If the height of the tower is wanted, the angle BCF will be found by the quadrant; which being taken from the angle ACB already known, the angle ACF will remain: but the angle FAC was known before; therefore the remaining angle AFC will be known. But the side AC was also known before; therefore, in the triangle AFC, all the angles and one of the sides AC being known, AF, the height of the tower above the hill, will be found by trigonometry.

SCHOLIUM.

It were easy to add many other methods of measuring heights and distances; but, if what is above be understood, it will be easy (especially for one that is versed in the elements) to contrive methods for this purpose, according to the occasion: so that there is no need of adding any more of this sort. We shall furnish here a method by which the diameter of the earth may be found out.

PROPOSITION XIX.

FIG. 1. *To find the diameter of the earth from one observation.*—Let there be chosen a high hill AB, near the sea-shore, and let the observer on the top of it, with an exact quadrant divided into minutes and seconds by transverse divisions, and fitted with a telescope in place of the common sights, measure the angle ABE contained under the right line AB, which goes to the centre, and the right line BE drawn to the sea, a tangent to the globe at E; let there be drawn from A perpendicular to BD, the line AF meeting BE in F. Now in the right-angled triangle BAF all the angles are given, also the side AB, the height of the hill; which is to be found by some of the foregoing methods, as exactly as possible; and (by trigonometry) the sides BF and AF are found. But, by cor. 36th 3. Eucl.

Geometry
Plate,
n^o IV.

3. Eucl. AF is equal to FE; therefore BE will be known. Moreover, by 36th 3. Eucl. the rectangle under BA and BD is equal to the square of BE. And thence by 17th 6. Eucl. as AB : BE :: BE : BD. Therefore, since AB and BE are already given, BD will be found by 11th 6. Eucl. or by the rule of three; and subtracting BA, there will remain AD the diameter of the earth sought.

SCHOLIUM.

Many other methods might be proposed for measuring the diameter of the earth. The most exact is that proposed by Mr Picart of the academy of sciences at Paris.

“According to Mr Picart, a degree of the meridian at the latitude of 49° 21', was 57,060 French toises, each of which contains six feet of the same measure: from which it follows, that, if the earth be an exact sphere, the circumference of a great circle of it will be 123,249,600 Paris feet, and the semidiameter of the earth 19,615,800 feet: but the French mathematicians, who of late have examined Mr Picart's operations, assure us, that the degree in that latitude is 57,183 toises. They measured a degree in Lapland, in the latitude of 66° 20', and found it of 57,438 toises. By comparing these degrees, as well as by the observations on pendulums, and the theory of gravity, it appears that the earth is an oblate spheroid; and (supposing those degrees to be accurately measured) the axis or diameter that passes through the poles will be to the diameter of the equator, as 177 to 178, or the earth will be 22 miles higher at the equator than at the poles. A degree has likewise been measured at the equator, and found to be considerably less than at the latitude of Paris; which confirms the oblate figure of the earth. But an account of this last mensuration has not been published as yet. If the earth was of an uniform density from the surface to the centre, then, according to the theory of gravity, the meridian would be an exact ellipsis, and the axis would be to the diameter of the equator as 230 to 231; and the difference of the semidiameter of the equator and semiaxis about 17 miles.”

In what follows, a figure is often to be laid down on paper, like to another figure given; and because this likeness consists in the equality of their angles, and in the sides having the same proportion to each other (by the definitions of the 6th of Eucl.) we are now to shew what methods practical geometers use for making on paper an angle equal to a given angle, and how they constitute the sides in the same proportion. For this purpose they make use of a protractor, (or, when it is wanting, a line of chords), and of a line of equal parts.

PROPOSITION XX.

FIG. 2. 3. 4. 5. and 6. To describe the construction and use of the protractor, of the line of chords, and of the line of equal parts. The protractor is a small semicircle of brass, or such solid matter. The semicircumference is divided into 180 degrees. The use of it is, to draw angles on any plane, as on paper, or to examine the extent of angles already laid down. For this last purpose, let the small point in the centre of the protractor be placed above the angular point, and let

the side AB coincide with one of the sides that contain the angle proposed; the number of degrees cut off by the other side, computing on the protractor from B, will shew the quantity of the angle that is to be measured.

But if an angle is to be made of a given quantity on a given line, and at a given point of that line, let AB coincide with the given line, and let the centre A of the instrument be applied to that point. Then let there be a mark made at the given number of degrees; and a right line drawn from that mark to the given point, will constitute an angle with the given right line of the quantity required; as is manifest.

This is the most natural and easy method, either for examining the extent of an angle on paper, or for describing on paper an angle of a given quantity.

But when there is scarcity of instruments, or because a line of chords is more easily carried about, (being described on a ruler on which there are many other lines besides), practical geometers frequently make use of it. It is made thus: let the quadrant of a circle be divided into 90 degrees; (as in fig. 4.) The line AB is the chord of 90 degrees; the chord of every arc of the quadrant is transferred to this line AB, which is always marked with the number of degrees in the corresponding arc.

Note, that the chord of 60 degrees is equal to the radius, by corol. 15. 4th Eucl. If now a given angle EDF is to be measured by the line of chords from the centre D, with the distance DG, (the chord of 60 degrees), describe the arch GF; and let the points G and F be marked where this arch intersects the sides of the angle. Then if the distance GF, applied on the line of chords from A to B, gives (for example) 25 degrees, this shall be the measure of the angle proposed.

When an obtuse angle is to be measured with this line, let its complement to a semicircle be measured, and thence it will be known. It were easy to transfer to the diameter of a circle the chords of all arches to the extent of a semicircle; but such are rarely found marked upon rules.

But now, if an angle of a given quantity, suppose of 50 degrees, is to be made at a given point M of the right line KL (fig. 6.) From the centre M, and the distance MN, equal to the chord of 60 degrees, describe the arc QN. Take off an arc NR, whose chord is equal to that of 50 degrees on the line of chords; join the points M and R; and it is plain that MR shall contain an angle of 50 degrees with the line KL proposed.

But sometimes we cannot produce the sides, till they be of the length of a chord of 60 degrees on our scale; in which case it is fit to work by a circle of proportions (that is a sector), by which an arc may be made of a given number of degrees to any radius.

The quantities of angles are likewise determined by other lines usually marked upon rules, as the lines of sines, tangents, and secants; but, as these methods are not so easy or so proper in this place, we omit them.

To delineate figures similar or like to others given, besides the equality of the angles, the same proportion is to be preserved among the sides of the figure that is to be delineated, as is among the sides of the figures given. For which purpose, on the rules used by artists, there

there is a line divided into equal parts, more or less in number, and greater or less in quantity, according to the pleasure of the maker.

A foot is divided into inches; and an inch, by means of transverse lines, into 100 equal parts; so that with this scale, any number of inches, below 12, with any part of an inch, can be taken by the compasses, providing such part be greater than the one 100th part of an inch. And this exactness is very necessary in delineating the plans of houses, and in other cases.

PROPOSITION XXI.

FIG. 7. To lay down on paper, by the protractor or line of chords, and line of equal parts, a right-lined figure like to one given, providing the angles and sides of the figure given be known by observation or mensuration. For example, suppose that it is known that in a quadrangular figure, one side is of 235 feet, that the angle contained by it and the second side is of 84°, the second side of 288 feet, the angle contained by it and the third side of 72°, and that the third side is 294 feet. These things being given, a figure is to be drawn on paper like to this quadrangular figure. On your paper at a proper point A, let a right line be drawn, upon which take 235 equal parts, as AB. The part representing a foot is taken greater or lesser, according as you would have your figure greater or less. In the adjoining figure, the 100th part of an inch is taken for a foot. And accordingly an inch divided into 100 parts, and annexed to the figure, is called a scale of 100 feet. Let there be made at the point B (by the preceding proposition) an angle ABC of 85°, and let BC be taken of 288 parts like to the former. Then let the angle BCD be made of 72°, and the side CD of 294 equal parts. Then let the side AD be drawn; and it will complete the figure like to the given. The measures of the angle A and D can be known by the protractor or line of chords, and the side AD by the line of equal parts; which will exactly answer to the corresponding angles and to the side of the primary figure.

After the very same manner, from the sides and angles given, which bound any right-lined figure, a figure like to it may be drawn, and the rest of its sides and angles be known.

COROLLARY.

Hence any trigonometrical problem in right-lined triangles, may be resolved by delineating the triangle from what is given concerning it, as in this proposition. The unknown sides are examined by a line of equal parts, and the angles by a protractor or line of chords.

PROPOSITION XXII.

The diameter of a circle being given, to find its circumference nearly.—The periphery of any polygon inscribed in the circle is less than the circumference, and the periphery of any polygon described about a circle is greater than the circumference. Whence Archimedes first discovered that the diameter was in proportion to the circumference, as 7 to 22 nearly; which serves for common use. But the moderns have computed the proportion of the diameter to the circumference to greater exactness. Supposing the diameter 100, the periphery will be more than 314, but less than 315. The diameter is more near-

ly to the circumference, as 113 to 355. But Ludolph van Cuelen exceeded the labours of all; for by immense study he found, that, supposing the diameter 100,000,000,000,000,000,000,000,000,000,000, the periphery will be less than

314,159,265,358,979,323,846,264,338,327,951,

but greater than

314,159,265,358,979,323,846,264,338,327,950;

whence it will be easy, any part of the circumference being given in degrees and minutes, to assign it in parts of the diameter.

Of Surveying and Measuring of LAND.

HITHERTO we have treated of the measuring of angles and sides, whence it is abundantly easy to lay down a field, a plane, or an entire country: for to this nothing is requisite but the protraction of triangles, and of other plain figures, after having measured their sides and angles. But as this is esteemed an important part of practical geometry, we shall subjoin here an account of it with all possible brevity; suggesting withal, that a surveyor will improve himself more by one day's practice, than by a great deal of reading.

PROPOSITION XXIII.

To explain what surveying is, and what instruments Surveyors use.—First, it is necessary that the surveyor view the field that is to be measured, and investigate its sides and angles, by means of an iron chain (having a particular mark at each foot of length, or at any number of feet, as may be most convenient for reducing lines or surfaces to the received measures), and the graphometer described above. Secondly, it is necessary to delineate the field in *piano*, or to form a map of it; that is, to lay down on paper a figure similar to the field; which is done by the protractor (or line of chords) and of the line of equal parts. Thirdly, It is necessary to find out the area of the field so surveyed and represented by a map. Of this last we are to treat below.

The sides and angles of small fields are surveyed by the help of a plain table: which is generally of an oblong rectangular figure, and supported by a *fulcrum*, so as to turn every way by means of a ball and socket. It has a moveable frame, which surrounds the board, and serves to keep a clean paper put on the board close and tight to it. The sides of the frame facing the paper are divided into equal parts every way. The board hath besides a box with a magnetic needle, and moreover a large index with two sights. On the edge of the frame of the board are marked degrees and minutes, so as to supply the room of a graphometer.

PROPOSITION XXIV.

FIG. 8. To delineate a field by the help of a plain-table, from one station whence all its angles may be seen and their distances measured by a chain.—Let the field that is to be laid down be ABCDE. At any convenient place F, let the plain-table be erected; cover it with clean paper, in which let some point near the middle represent the station. Then applying at this place the index with the sights, direct it so as that through the sights some mark may be seen at one of the angles, suppose A; and from the point F, representing the station, draw a faint right line along the side of the index: then, by the help of the chain, let FA the distance

tance of the station from the forefaid angle be measured. Then taking what part you think convenient for a foot or pace from the line of equal parts, set off on the faint line the parts corresponding to the line FA that was measured; and let there be a mark made representing the angle of the field A. Keeping the table immovable, the fame is to be done with the rest of the angles; then right lines joining those marks shall include a figure like to the field, as is evident from 5, 6. Eucl.

C O R O L L A R Y.

The same thing is done in like manner by the graphometer: for having observed in each of the triangles, AFB, BFC, CFD, &c. the angle at the station F, and having measured the lines from the station to the angles of the field, let similar triangles be protracted on paper (by the 21. prop. of this) having their common vertex in the point of station. All the lines, excepting those which represent the sides of the field, are to be drawn faint or obscure.

Note 1. When a surveyor wants to lay down a field let him place distinctly in a register all the observations of the angles, and the measures of the sides, until, at time and place convenient, he draw out the figure on paper.

Note 2. The observations made by the help of the graphometer are to be examined: for all the angles about the point F ought to be equal to four right ones. (by cor. 2. art. 30. of Part I.)

P R O P O S I T I O N XXV.

FIG. 9. *To lay down a field by means of two stations, from each of which all the angles can be seen, by measuring only the distance of the stations.*—Let the instrument be placed at the station F: and having chosen a point representing it upon the paper which is laid upon the plain table, let the index be applied at this point, so as to be moveable about it. Then let it be directed successively to the several angles of the field: and when any angle is seen through the sights, draw an obscure line along the side of the index. Let the index, with the sights, be directed after the same manner to the station G: on the obscure line drawn along its side, pointing to A, set off from the scale of equal parts a line corresponding to the measured distance of the stations, and this will determine the point G. Then remove the instrument to the station G, and applying the index to the line representing the distance of the stations, place the instrument so that the first station may be seen through the sights. Then the instrument remaining immovable, let the index be applied at the point representing the second station G, and be successively directed by means of its sights, to all the angles of the field, drawing (as before) obscure lines: and the intersection of the two obscure lines that were drawn to the same angle from the two stations will always represent that angle on the plan. Care must be taken that those lines be not mistaken for one another. Lines joining those intersections will form a figure on the paper like to the field.

S C H O L I U M.

It will not be difficult to do the same by the graphometer, if you keep a distinct account of your observations of the angles made by the line joining the stations, and the lines drawn from the stations to the

respective angles of the field. And this is the most common manner of laying down whole countries. The tops of two mountains are taken for two stations, and their distance is either measured by some of the methods mentioned above, or is taken according to common report. The sights are successively directed towards cities, churches, villages, forts, lakes, turnings of rivers, woods, &c.

Note, The distance of the stations ought to be great enough, with respect to the field that is to be measured; such ought to be chosen as are not in a line with any angle of the field. And care ought to be taken likewise that the angles, for example, FAG, FDG, &c. be neither very acute, nor very obtuse. Such angles are to be avoided as much as possible; and this admonition is found very useful in practice.

P R O P O S I T I O N XXVI.

FIG. 10. *To lay down any field, however irregular its figure may be, by the help of the graphometer.*—Let ABCEDHG be such a field. Let its angles (in going round it) be observed with a graphometer (by the 12. of this) and noted down; let its sides be measured with a chain; and (by what was said on the 21. of this) let a figure like to the given field be protracted on paper. If any mountain is in the circumference, the horizontal line hid under it is to be taken for a side, which may be found by two or three observations according to some of the methods described above; and its place on the map is to be distinguished by a shade, that it may be known a mountain is there.

If not only the circumference of the field is to be laid down on the plan, but also its contents, as villages, gardens, churches, public roads, we must proceed in this manner.

Let there be (for example) a church F, to be laid down in the plan. Let the angles ABF BAF be observed and protracted on paper in their proper places, the intersection of the two sides BF and AF will give the place of the church on the paper: or, more exactly, the lines BF AF being measured, let circles be described from the centres B and A, with parts from the scale corresponding to the distances BF and AF, and the place of the church will be at their intersection.

Note 1. While the angles observed by the graphometer are taken down, you must be careful to distinguish the external angles, as E and G, that they may be rightly protracted afterwards on paper.

Note 2. Our observations of the angles may be examined by computing if all the internal angles make twice as many right angles, four excepted, as there are sides of the figure: (for this is demonstrated by 32. 1. Eucl.) But in place of any external angle DEC, its complement to a circle is to be taken.

P R O P O S I T I O N XXVII.

FIG. 11. *To lay down a plain field without instruments.*—If a small field is to be measured, and a map of it to be made, and you are not provided with instruments; let it be supposed to be divided into triangles, by right lines, as in the figure; and after measuring the three sides of any of the triangles, for example of ABC, let its sides be laid down from a convenient scale on paper, (by the 22. of this.) Again, let the other two sides BD CD of the triangle CBD be measured and protracted on the paper by the same

scale

scale as before. In the same manner proceed with the rest of the triangles of which the field is composed, and the map of the field will be perfected; for the three sides of a triangle determine the triangle; whence each triangle on the paper is similar to its correspondent triangle in the field, and is similarly situated; consequently the whole figure is like to the whole field.

S C H O L I U M.

If the field be small, and all its angles may be seen from one station, it may be very well laid down by the plain-table, (by the 24. of this.) If the field be larger, and have the requisite conditions, and great exactness is not expected, it likewise may be plotted by means of the plain-table, or by the graphometer, (according to the 25. of this;) but in fields that are irregular and mountainous, when an exact map is required, we are to make use of the graphometer, (as in the 26. of this,) but rarely of the plain-table.

Having protracted the bounding lines, the particular parts contained within them may be laid down by the proper operations for this purpose, (delivered in the 26th proposition; and the method described in the 27th proposition may be sometimes of service;) for we may trust more to the measuring of sides, than to the observing of angles. We are not to compute four-sided and many sided figures till they are resolved into triangles: for the sides do not determine those figures.

In the laying down of cities, or the like, we may make use of any of the methods described above that may be most convenient.

The map being finished, it is transferred on clean paper, by putting the first sketch above it, and marking the angles by the point of a small needle. These points being joined by right lines, and the whole illuminated by colours proper to each part, and the figure of the mariner's compass being added to distinguish the north and south, with a scale on the margin, the map or plan will be finished and neat.

We have thus briefly and plainly treated of surveying, and shown by what instruments it is performed; having avoided those methods which depend on the magnetic needle, not only because its direction may vary in different places of a field (the contrary of this at least doth not appear,) but because the quantity of an angle observed by it cannot be exactly known; for an error of two or three degrees can scarcely be avoided in taking angles by it.

As for the remaining part of surveying, whereby the area of a field already laid down on paper is found in acres, roods, or any other superficial measures; this we leave to the following section, which treats of the mensuration of surfaces.

" Besides the instruments described above, a surveyor ought to be provided with an off-set staff equal in length to 10 links of the chain, and divided into 10 equal parts. He ought likewise to have 10 arrows or small straight sticks near two feet long, shod with iron ferrils. When the chain is first opened, it ought to be examined by the off-set staff. In measuring any line, the leader of the chain is to have the 10 arrows at first setting out. When the

" chain is stretched in the line, and the near end touches the place from which you measure, the leader sticks one of the 10 arrows in the ground, at the far end of the chain. Then the leader leaving the arrow, proceeds with the chain another length; and the chain being stretched in the line, so that the near end touches the first arrow, the leader sticks down another arrow at his end of the chain. The line is preserved straight, if the arrows be always set so as to be in a right line with the place you measure from, and that to which you are going. In this manner they proceed till the leader have no more arrows. At the eleventh chain, the arrows are to be carried to him again, and he is to stick one of them into the ground, at the end of the chain. And the same is to be done at the 21. 31. 41. &c. chains, if there are so many in a right line to be measured. In this manner you can hardly commit an error in numbering the chains, unless of 10 chains at once.

" The off-set staff serves for measuring readily the distances of any things proper to be represented in your plan, from the station-line while you go along. These distances ought to be entered into your field-book, with the corresponding distances from the last station, and proper remarks, that you may be enabled to plot them justly, and be in no danger of mistaking one for another when you extend your plan. The field-book may be conveniently divided into five columns. In the middle column the angles at the several stations taken by the theodolite are to be entered, with the distances from the stations. The distances taken by the off-set staff, on either side of the station-line, are to be entered into columns on either side of the middle column, according to their position with respect to that line. The names and characters of the objects, with proper remarks, may be entered in columns on either side of these last.

" Because, in the place of the graphometer described by our author, surveyors now make use of the theodolite, we shall subjoin a description of Mr Sisson's latest improved theodolite from Mr Gardner's practical surveying improved. See a figure of it in the IVth Plate.

" In this instrument, the three staffs, by brass ferrils at top, screw into bell-metal joints, that are moveable between brass pillars, fixed in a strong brass plate; in which, round the centre, is fixed a socket with a ball moveable in it, and upon which the four screws press, that set the limb horizontal: Next above is another such plate, through which the said screws pass, and on which, round the centre, is fixed a frustum of a cone of bell-metal, whose axis is being connected with the centre of the bell) is always perpendicular to the limb, by means of a conical brass ferril fitted to it, whereon is fixed the compass-box; and on it the limb, which is a strong bell-metal ring, whereon are moveable three brass indexes; in whose plate are fixed four brass pillars, that, joining at top, hold the centre pin of the bell-metal double sextant, whose double index is fixed on the centre of the same plate: Within the double sextant is fixed the spirit-level, (c) and

“and over it the telescope.

“The compass-box is graved with two diamonds for north and south, and with 20 degrees on both sides of each, that the needle may be set to the variation, and its error also known.

“The limb has two *heurs de luce* against the diamonds in the box, instead of 180 each, and is curiously divided into whole degrees, and numbered to the left hand at every 10 to twice 180, having three indexes distant 120, (with Nonius's divisions on each for the decimals of a degree,) that are moved by a pinion fixed below one of them, without moving the limb; and in another is a screw and spring under, to fix it to any part of the limb. It has also divisions numbered, for taking the quarter girt in inches of round timber at the middle height, when standing 10 feet horizontally distant from its centre; to which at 20 must be doubled, and at 30 tripled; to which a shorter index is used, having Nonius's divisions for the decimals of an inch; but an abatement must be made for the bark, if not taken off.

“The double sextant is divided on one side from under its centre (when the spirit-tube and telescope are level) to above 60 degrees each way, and numbered at 10, 20, &c. and the double index (through which it is moveable) shews on the same side the degree and decimal of any altitude or depression to that extent by Nonius's divisions: On the other side are divisions numbered, for taking the upright height of timber, &c. in feet, when distant 10 feet; which at 20 must be doubled, and at 30 tripled; and also the quantities for reducing hypotenusal lines to horizontal. It is moveable by a pinion fixed in the double index.

“The telescope is a little shorter than the diameter of the limb, that a fall may not hurt it; yet it will magnify as much, and shew a distant object as perfect, as most of triple its length. In its focus are very fine cross wires, whose intersection is in the plane of the double sextant; and this was a whole circle, and turned in a lathe to a true plane, and is fixed at right angles to the limb; so that, whenever the limb is set horizontal, (which is readily done by making the spirit-tube level over two screws, and the like over the other two,) the double sextant and telescope are moveable in a vertical plane; and then every angle taken on the limb (though the telescope be never so much elevated or depressed) will be an angle in the plane of the horizon. And this is absolutely necessary in plotting a horizontal plane.

“If the lands to be plotted are hilly, and not in any one plane, the lines measured cannot be truly laid down on paper, without being reduced to one plane, which must be the horizontal, because angles are taken in that plane.—

“In viewing your objects, if they have much altitude or depression, either write down the degree and decimal shewn on the double sextant, or the links shewn on the back side; which last subtracted from every chain in the station-line, leaves the length in the horizontal plane. But if the degree is taken, the following table will shew the quantity.

A Table of the links to be subtracted out of every chain in hypotenusal lines of several degrees altitude, or depression, for reducing them to horizontal.

<i>Degrees. Links.</i>	<i>Degrees. Links.</i>	<i>Degrees. Links.</i>
4,95 — $\frac{1}{2}$	14,07 — 3	23,074 — 8
5,73 — $\frac{1}{2}$	16,26 — 4	24,495 — 9
7,02 — $\frac{1}{2}$	18,195 — 5	25,84 — 10
8,11 — 1	19,95 — 6	27,13 — 11
11,48 — 2	21,565 — 7	28,36 — 12

“Let the first station line really measure 1107 links, and the angle of altitude or depression be 19°, 95; looking in the table you will find against 19°, 95, is 6 links. Now 6 times 11 is 66, which subtracted from 1107, leaves 1041, the true length to be laid down in the plan.

“It is useful in surveying, to take the angles, which the bounding lines form, with the magnetic needle, in order to check the angles of the figure, and to plot them conveniently afterwards.”

Of the Surfaces of Bodies.

THE smallest superficial measure with us is a square inch; 144 of which make a square foot. Wrights make use of these in the measuring of deals and planks; but the square foot which the glazier's use in measuring of glass, consists only of 64 square inches. The other measures are, first, the ell square; secondly, the fall, containing 36 square ells; thirdly, the rood, containing 40 falls; fourthly, the acre, containing 4 roods. Slaters, masons, and pavers, use the ell square and the fall; surveyors of land use the square ell, the fall, the rood, and the acre.

The superficial measures of the English are, first, the square foot; secondly, the square yard, containing 9 square feet, for their yard contains only 3 feet; thirdly, the pole, containing 30½ square yards; fourthly, the rood, containing 40 poles; fifthly, the acre, containing 4 roods. And hence it is easy to reduce our superficial measures to the English, or theirs to ours.

“In order to find the content of a field, it is most convenient to measure the lines by the chains described above, p. 9, that of 22 yards for computing the English acres, and that of 24 Scots ells for the acres of Scotland. The chain is divided into 100 links, and the square of the chain is 10,000 square links; 10 squares of the chain, or 100,000 square links, give an acre. Therefore, if the area be expressed by square links, divide by 100,000, or cut off five decimal places, and the quotient shall give the area in acres and decimals of an acre. Write the entire acres apart; but multiply the decimals of an acre by 4, and the product shall give the remainder of the area in roods and decimals of a rood. Let the entire roods be noted apart after the acres; then multiply the decimals of a rood by 40, and the product shall give the remainder of the area in falls or poles. Let the entire falls or poles be then writ after the roods, and multiply the decimals of a fall by 36, if the area is required in the measures of Scotland; but multiply the decimals of a pole by 30½, if the area is required in the measures of England, and the product shall give the remainder of the area in square ells in the former case, but

"in square yards in the latter. If, in the former case, you would reduce the decimals of the square ell to square feet, multiply them by 9.50994; but, in the latter case, the decimals of the English square yard are reduced to square feet, by multiplying them by 9.

"Suppose, for example, that the area appears to contain 12.65842 square links of the chain of 24 ells; and that this area is to be expressed in acres, roods, falls, &c. of the measures of Scotland. Divide the square links by 100,000, and the quotient 12.65842 shows the area to contain 12 acres $\frac{65842}{100000}$ of an acre. Multiply the decimal part by 4, and the product 2.63368 gives the remainder in roods and decimals of a rood. Those decimals of the rood being multiplied by 40, the product gives 25.3472 falls. Multiply the decimals of the fall by 36, and the product gives 12.4092 square ells. The decimals of the square ell multiplied by 9.50994 give 4.7458 square feet. Therefore the area proposed amounts to 12 acres, 2 roods, 25 falls, 12 square ells, and $4\frac{7458}{100000}$ square feet.

"But if the area contains the same number of square links of Gunter's chain, and is to be expressed by English measures, the acres and roods are computed in the same manner as in the former case. The poles are computed as the falls. But the decimals of the pole, viz. $\frac{3457}{10000}$, are to be multiplied by 30 $\frac{1}{2}$ (or 30.25), and the product gives 10.5028 square yards. The decimals of the square yard, multiplied by 9, give 4.5252 square feet; therefore, in this case, the area is in English measure 12 acres, 2 roods, 25 poles, 10 square yards, and $4\frac{5252}{10000}$ square feet.

"The Scots acre is to the English acre, by statute, as 100,000 to 78,694, if we have regard to the difference betwixt the Scots and English foot above mentioned. But it is customary in some parts of England to have 18,21, &c. feet to a pole, and 160 such poles to an acre; whereas, by the statute, 16 $\frac{1}{2}$ feet make a pole. In such cases the acre is greater in the duplicate ratio of the number of feet to a pole.

"They who measure land in Scotland by an ell of 37 English inches, make the acre less than the true Scots acre by $593\frac{1}{2}$ square English feet, or by about $\frac{1}{10}$ of the acre.

"An husband-land contains 6 acres of sock and sythe-land, that is, of land that may be tilled with a plough, and mown with a sythe; 13 acres of arable land make an oxgang or oxengate; four oxengate make a pound-land of old extent (by a decree of the Exchequer, March 11. 1585), and is called *librata terra*. A forty-shilling land of old extent contains eight oxgang, or 104 acres.

"The arpent, about Paris, contains 32400 square Paris feet, and is equal to 2 $\frac{1}{2}$ Scots roods, or 3 $\frac{1}{2}$ English roods.

"The *altus quadratus*, according to Varro, Columella, &c. was a square of 120 Roman feet. The *jugerum* was the double of this. It is to the Scots acre as 10,000 to 20,456, and to the English acre as 10,000 to 16,097. It was divided (like the *as*) into 12 *uncia*, and the *uncia* into 24 *scrupula*."—This, with the three preceding paragraphs, are taken

from an ingenious manuscript, written by Sir Robert Stewart professor of natural philosophy. The greatest part of the table in p. 9, 10. was taken from it likewise.

PROPOSITION XXVIII.

FIG. 12. To find out the area of a rectangular parallelogram ABCD.—Let the side AB, for example, be 5 feet long, and BC (which conflutes with BA at right angle at B) be 17 feet. Let 17 be multiplied by 5, and the product 85 will be the number of square feet in the area of the figure ABCD. But if the parallelogram proposed is not rectangular as BEFC, its base BC multiplied into its perpendicular height AB (not into its side BE) will give its area. This is evident from art. 68. of Part I.

PROPOSITION XXIX.

FIG. 13. To find the area of a given triangle.—Let the triangle BAC be given, whose base BC is supposed 9 feet long: let the perpendicular AD be drawn from the angle A opposite to the base, and let us suppose AD to be 4 feet. Let the half of the perpendicular be multiplied into the base, or the half of the base into the perpendicular, or take the half of the product of the whole base into the perpendicular, the product gives 18 square feet for the area of the given triangle.

But if only the sides are given, the perpendicular is found either by protracting the triangle, or by 12th and 13th 2. Eucl. or by trigonometry. But how the area of a triangle may be found from the given sides only, shall be shewn in the 31st proposition.

PROPOSITION XXX.

FIG. 14. To find the area of any rectilineal figure.—If the figure be irregular, let it be resolved into triangles; and drawing perpendiculars to the bases in each of them, let the area of each triangle be found by the preceding proposition, and the sum of these areas will give the area of the figure.

SCHOLIUM I.

In measuring boards, planks, and glass, their sides are to be measured by a foot-rule divided into 100 equal parts; and after multiplying the sides, the decimal fractions are easily reduced to lesser denominations. The mensuration of these is easy, when they are rectangular parallelograms.

SCHOLIUM 2.

If a field is to be measured, let it first be plotted on paper, by some of the methods above described, and let the figure so laid down be divided into triangles, as was shewn in the preceding proposition.

The base of any triangle, or the perpendicular upon the base, or the distance of any two points of the field, is measured by applying it to the scale according to which the map is drawn.

SCHOLIUM 3.

But if the field given be not in a horizontal plane, but uneven and mountainous, the scale gives the horizontal line between any two points, but not their distance measured on the uneven surface of the field. And indeed it would appear, that the horizontal plane is to be accounted the area of an uneven and hilly country. For if such ground is laid out for building on, or for planting with trees, or bearing corn, since these stand perpendicular to the horizon, it is plain, that a mountainous country cannot be considered as of greater extent for those uses than the horizontal

plane: nay, perhaps, for nourishing of plants, the horizontal plane may be preferable.

If, however, the area of a figure, as it lies regularly on the surface of the earth, is to be measured, this may be easily done by resolving it into triangles as it lies. The sum of their areas will be the area sought; which exceeds the area of the horizontal figure more or less, according as the field is more or less uneven.

PROPOSITION XXXI.

FIG. 13. *The sides of a triangle being given, to find the area, without finding the perpendicular.*—Let all the sides of the triangle be collected into one sum; from the half of which let the sides be separately subtracted, that three differences may be found betwixt the foresaid half sum and each side; then let these three differences and the half sum be multiplied into one another, and the square root of the product will give the area of the triangle. For example, let the sides be 10, 17, 21; the half of their sum is 24; the three differences betwixt this half sum and the three sides, are 14, 7, and 3. The first being multiplied by the second, and their product by the third, we have 294 for the product of the differences; which multiplied by the foresaid half sum 24, gives 7056; the square root of which 84 is the area of the triangle. The demonstration of this, for the sake of brevity, we omit. It is to be found in several treatises, particularly in Clavius's Practical Geometry.

PROPOSITION XXXII.

FIG. 15. *The area of the ordinate figure ABEFGH in equal to the product of the half circumference of the polygon, multiplied into the perpendicular drawn from the centre of the circumscribed circle to the side of the polygon.*—For the ordinate figure can be resolved into as many equal triangles, as there are sides of the figure; and since each triangle is equal to the product of half the base into the perpendicular, it is evident that the sum of all the triangles together, that is the polygon, is equal to the product of half the sum of the bases (that is the half of the circumference of the polygon) into the common perpendicular height of the triangles drawn from the centre C to one of the sides; for example, to AB.

PROPOSITION XXXIII.

FIG. 16. *The area of a circle is found by multiplying the half of the periphery into the radius, or the half of the radius into the periphery.*—For a circle is not different from an ordinate or regular polygon of an infinite number of sides, and the common height of the triangles into which the polygon or circle may be supposed to be divided is the radius of the circle.

Were it worth while, it were easy to demonstrate accurately this proposition, by means of the inscribed and circumscribed figures, as is done in the 5th prop. of the treatise of Archimedes concerning the dimensions of the circle.

COROLLARY.

Hence also it appears, that the area of the sector ABCD is produced by multiplying the half of the arc into the radius, and likewise that the area of the segment of the circle AIDC is found by subtracting from the area of the sector the area of the triangle ABC.

PROPOSITION XXXIV.

FIG. 17. *The circle is to the square of the diameter, as 11 to 14 nearly.*—For if the diameter AB be supposed to be 7, the circumference AHBK will be almost 22 (by the 22^d prop. of this Part), and the area of the square DC will be 49; and, by the preceding prop. the area of the circle will be $38\frac{1}{2}$; therefore the square DC will be to the inscribed circle as 49 to $38\frac{1}{2}$, or as 98 to 77, that is, as 14 to 11. Q. E. D.

If greater exactness is required, you may proceed to any degree of accuracy: for the square DC is to the inscribed circle, as 11 to $11 - \frac{1}{14} + \frac{1}{14} - \frac{1}{14} + \frac{1}{14} - \frac{1}{14} + \frac{1}{14}$, &c. in infinitum.

“This series will be of no service for computing the area of the circle accurately, without some further artifice, because it converges at too slow a rate.”
“The area of the circle will be found exactly enough for most purposes, by multiplying the square of the diameter by 7854, and dividing by 10,000, or cutting off four decimal places from the product; for the area of the circle is to the circumscribed square nearly as 7854 to 10,000.”

PROPOSITION XXXV.

FIG. 18. *To find the area of a given ellipse.*—Let ABCD be an ellipse, whose greater diameter is BD, and the lesser AC, bisecting the greater perpendicularly in E. Let a mean proportional HF be found (by 13th 6. Eucl.) between AC and BD, and (by the 33^d of this) find the area of the circle described on the diameter HF. This area is equal to the area of the ellipse ABCD. For because, as BD to AC, so the square of BD to the square of HF, (by 2. cor. 20th 6. Eucl.): but (by the 2^d 12. Eucl.) as the square of BD to the square of HF, so is the circle of the diameter BD to the circle of the diameter HF: therefore as BD to AC, so is the circle of the diameter BD to the circle of the diameter HF. And (by the 5th prop. of Archimedes of spheroids) as the greater diameter BD to the lesser AC, so is the circle of the diameter BD to the ellipse ABCD. Consequently (by the 11th 5. Eucl.) the circle of the diameter BD will have the same proportion to the circle of the diameter HF, and to the ellipse ABCD. Therefore, (by 9th 5. Eucl.) the area of the circle of the diameter HF will be equal to the area of the ellipse ABCD. Q. E. D.

SCHOLIUM.

From this and the two preceding propositions, a method is derived of finding the area of an ellipse. There are two ways: 1st, Say, as one is to the lesser diameter, so is the greater diameter to a fourth number, (which is found by the rule of three.) Then again say, as 14 to 11, so is the fourth number found to the area sought. But the second way is shorter. Multiply the lesser diameter into the greater, and the product by 11; then divide the whole product by 14, and the quotient will be the area sought of the ellipse. For example, Let the greater diameter be 10, and the lesser 7; by multiplying 10 by 7, the product is 70; and multiplying that by 11, it is 770; and dividing 770 by 14, the quotient will be 55, which is the area of the ellipse sought.

“The area of the ellipse will be found more accurately, by multiplying the product of the two diameters by 7854.”

We shall add no more about other plain surfaces, whether rectilinear or curvilinear, which seldom occur in practice; but shall subjoin some propositions about measuring the surfaces of solids.

PROPOSITION XXXVI.

To measure the surface of any prism.—By the 14th definition of the 11th Eucl. a prism is contained by planes, of which two opposite sides (commonly called the bases) are plain rectilinear figures; which are either regular and ordinate, and measured by prop. 32. of this; or however irregular, and then they are measured by the 28th prop. The other sides are parallelograms, which are measured by prop. 28th; and the whole superficies of the prism consists of the sum of those taken altogether.

PROPOSITION XXXVII.

To measure the superficies of any pyramid.—Since its basis is a rectilinear figure, and the rest of the planes terminating in the top of the pyramid are triangles; these measured separately, and added together, give the surface of the pyramid required.

PROPOSITION XXXVIII.

To measure the superficies of any regular body.—These bodies are called regular, which are bounded by equilateral and equiangular figures. The superficies of the tetraedon consists of four equal and equiangular triangles; the superficies of the hexaedron, or cube, of six equal squares; an octedron, of eight equal equilateral triangles; a dodecaedron, of twelve equal and ordinate pentagons; and the superficies of an icosaedron of twenty equal and equilateral triangles. Therefore it will be easy to measure these surfaces from what has been already shown.

In the same manner we may measure the superficies of a solid contained by any planes.

PROPOSITION XXXIX.

FIG. 19. To measure the superficies of a cylinder.—Because a cylinder differs very little from a prism, whose opposite planes (or bases) are ordinate figures of an infinite number of sides, it appears that the superficies of a cylinder, without the bases, is equal to an infinite number of parallelograms; the common altitude of all which is the same with the height of the cylinder, and the bases of them all differ very little from the periphery of the circle which is the base of the cylinder. Therefore this periphery multiplied into the common height, gives the superficies of the cylinder, excluding the bases; which are to be measured separately by the 33^d proposition.

This proposition concerning the measure of the surface of the cylinder (excluding its basis) is evident from this, that when it is conceived to be spread out, it becomes a parallelogram, whose base is the periphery of the circle of the base of the cylinder stretched into a right line, and whose height is the same with the height of the cylinder.

PROPOSITION XL.

FIG. 20. To measure the surface of a right cone.—The surface of a right cone is very little different from the surface of a right pyramid, having an ordinate polygon for its base of an infinite number of sides; the surface of which (excluding the base) is equal to the sum of the triangles. The sum of the bases of these triangles is equal to the periphery of the circle of the

base, and the common height of the triangles is the side of the cone AB; wherefore the sum of these triangles is equal to the product of the sum of the bases (*i. e.* the periphery of the base of the cone) multiplied into the half of the common height, or it is equal to the product of the periphery of the base.

If the area of the base is likewise wanted, it is to be found separately by the 33^d prop. If the surface of a cone is supposed to be spread out on a plane, it will become a sector of a circle, whose radius is the side of the cone; and the arc terminating, the sector is made from the periphery of the base. Whence, by corol. 33^d prop. of this, its dimension may be found.

COROLLARY.

Hence it will be easy to measure the surface of a frustrum of a cone cut by a plane parallel to the base.

PROPOSITION XLI.

FIG. 21. To measure the surface of a given sphere.—Let there be a sphere, whose centre is A, and let the area of its convex surface be required. Archimedes demonstrates (37th prop. 1. book of the sphere and cylinder) that its surface is equal to the area of four great circles of the sphere; that is, let the area of the great circle be multiplied by 4, and the product will give the area of the sphere; or, (by the 20th 6. and 2^d 12. of Eucl.) the area of the sphere given is equal to the area of a circle whose radius is the right line BC, the diameter of the sphere. Therefore having measured (by 33^d prop.) the circle described with the radius BC, this will give the surface of the sphere.

PROPOSITION XLII.

FIG. 22. To measure the surface of a segment of a sphere.—Let there be a segment cut off by the plane ED. Archimedes demonstrates (49. and 50. 1. De sphaera) that the surface of this segment, excluding the circular base, is equal to the area of a circle whose radius is the right line BE drawn from the vertex B of the segment to the periphery of the circle DE. Therefore, (by the 33^d prop.) it is easily measured.

COROLLARY.

Hence that part of the surface of a sphere that lieth between two parallel planes is easily measured, by subtracting the surface of the lesser segment from the surface of the greater segment.

COROLLARY 2.

Hence likewise it follows, that the surface of a cylinder, described about a sphere (excluding the basis) is equal to the surface of the sphere, and the parts of the one to the parts of the other, intercepted between planes parallel to the basis of the cylinder.

Of solid Figures and their Mensuration, comprehending likewise the Principles of Gauging Vessels of all Figures.

As in the former part of this treatise we took an inch for the smallest measure in length, and an inch square for the smallest superficial measure; so now, in treating of the mensuration of solids, we take a cubical inch for the smallest solid measure. Of these 109 make a Scots pint; other liquid measures depend on this, as is generally known.

In dry measures, the firlo, by statute, contains 19 $\frac{1}{2}$ pints; and on this depend the other dry measures: therefore, if the content of any solid be given in cubical

bical inches, it will be easy to reduce the same to the common liquid or dry measures, and conversely to reduce these to solid inches. The liquid and dry measures, in use among other nations, are known from their writers.

"As to the English liquid measures, by act of parliament 1706, any round vessel commonly called a cylinder, having an even bottom, being seven inches in diameter throughout, and six inches deep from the top of the inside to the bottom, (which vessel will be found by computation to contain $230\frac{2}{3}\frac{1}{2}$ cubical inches,) or any vessel containing 231 cubical inches, and no more, is deemed to be a lawful wine-gallon. An English pint therefore contains $28\frac{1}{2}$ cubical inches; 2 pints make a quart; 4 quarts a gallon; 18 gallons a roundlet; 3 roundlets and an half, or 63 gallons, make a hoghead; the half of a hoghead is a barrel; 1 hoghead and a third, or 84 gallons, make a puncheon; 1 puncheon and a half, or 2 hogheads, or 126 gallons, make a pipe or butt; the third part of a pipe, or 42 gallons, make a tierce; 2 pipes, or 3 puncheons, or 4 hogheads, make a ton of wine. Though the English wine gallon is now fixed at 231 cubical inches, the standard kept in Guildhall being measured, before many persons of distinction, May 23. 1688, it was found to contain only 224 such inches.

"In the English beer-measure, a gallon contains 282 cubical inches; consequently $35\frac{1}{2}$ cubical inches make a pint, 2 pints make a quart, 4 quarts make a gallon, 9 gallons a firkin, 4 firkins a barrel. In ale, 8 gallons make a firkin, and 32 gallons make a barrel. By an act of the first of William and Mary, 34 gallons is the barrel, both for beer and ale, in all places, except within the weekly bills of mortality.

"In Scotland it is known that 4 gills make a mutchkin, 2 mutchkins make a chopin; a pint is two chopins; a quart is two pints; and a gallon is four quarts, or eight pints. The accounts of the cubical inches contained in the Scots pint vary considerably from each other. According to our author, it contains 109 cubical inches. But the standard-jugs kept by the dean of guild of Edinburgh (one of which has the year 1555, with the arms of Scotland, and the town of Edinburgh, marked upon it) having been carefully measured several times, and by different persons, the Scots pint, according to those standards, was found to contain about $103\frac{1}{2}$ cubic inches. The pewterers jugs (by which the vessels in common use are made) are said to contain sometimes betwixt 105 and 106 cubic inches. A cask that was measured by the brewers of Edinburgh, before the commissioners of excise in 1707, was found to contain $46\frac{1}{2}$ Scots pints; the same vessel contained $18\frac{1}{2}$ English ale-gallons. Supposing this mensuration to be just, the Scots pint will be to the English ale-gallon as 289 to 750; and if the English ale-gallon be supposed to contain 282 cubical inches, the Scots pint will contain 108.664 cubical inches. But it is suspected, on several grounds, that the experiment was not made with sufficient care and exactness.

"The commissioners appointed by authority of parliament to settle the measures and weights, in their

act of Feb. 19. 1618, relate, That having caused fill the Linlithgow firloft with water, they found that it contained $21\frac{1}{2}$ pints of the just Stirling jug and measure. They likewise ordain that this shall be the just and only firloft; and add, *That the wideness and breadth of the which firloft, under and above even over within the buirds, shall contain nineteen inches and the sixth part of an inch, and the deepness seven inches and a third part of an inch.* According to this act (supposing their experiment and computation to have been accurate) the pint contained only 99.56 cubical inches; for the content of such a vessel as is described in the act, is 2115.85, and this divided by $21\frac{1}{2}$ gives 99.56. But, by the weight of water said to fill this firloft in the same act, the measure of the pint agrees nearly with the Edinburgh standard above mentioned.

"As for the English measures of corn, the Winchester gallon contains $272\frac{1}{2}$ cubical inches; 2 gallons make a peck; 4 pecks, or 8 gallons (that is, 2178 cubical inches) make a bushel; and a quarter is 8 bushels.

"Our author says, that $19\frac{1}{2}$ Scots pints make a firloft. But this does not appear to be agreeable to the statute above-mentioned, nor to the standard-jugs. It may be conjectured that the proportion assigned by him has been deduced from some experiment of how many pints, according to common use, were contained in the firloft. For if we suppose those pints to have been each of 108.664 cubical inches, according to the experiment made in the 1707 before the commissioners of excise, described above; then $19\frac{1}{2}$ such pints will amount to 2118.94, cubical inches; which agrees nearly with 2115.85, the measure of the firloft by statute above-mentioned. But it is probable, that in this he followed the act 1587, where it is ordained, That the wheat-firloft shall contain 19 pints and two joucates. A wheat-firloft marked with the Linlithgow stamps being measured, was found to contain about 2211 cubical inches. By the statute of 1618 the barley-firloft was to contain 31 pints of the just Stirling-jug.

"A Paris pint is 48 cubical Paris inches, and is nearly equal to an English wine-quart. The *Boisseau* contains 644.68099 Paris cubical inches, or 780.36 English cubical inches.

"The Roman *amphora* was a cubical Roman foot, the *congius* was the eighth part of the *amphora*, the *sextarius* was one sixth of the *congius*. They divided the *sextarius* like the *as* or *libra*. Of dry measures, the *medimnus* was equal to two *amphoras*, that is, about $1\frac{1}{2}$ English legal bushels; and the *modius* was the third part of the *amphora*."

PROPOSITION XLIII.

To find the solid content of a given prism.—By the 29th prop. let the area of the base of the prism be measured, and be multiplied by the height of the prism, the product will give the solid content of the prism.

PROPOSITION XLIV.

To find the solid content of a given pyramid.—The area of the base being found, (by the 30th prop.) let it be multiplied by the third part of the height of the pyramid, or the third part of the base by the height, the product will give the solid content, by 17th 12. Eucl.

C O R.

COROLLARY.

If the solid content of a *frustum* of a pyramid is required, first let the solid content of the entire pyramid be found; from which subtract the solid content of the part that is wanting, and the solid content of the broken pyramid will remain.

PROPOSITION XLV.

To find the content of a given cylinder.—The area of the base being found by prop. 33. if it be a circle, and by prop. 35. if it be an ellipse, (for in both cases it is a cylinder), multiply it by the height of the cylinder, and the solid content of the cylinder will be produced.

COROLLARY.

FIG. 23. And in this manner may be measured the solid content of vessels and calks not much different from a cylinder, as ABCD. If towards the middle EF it be somewhat grosser, the area of the circle of the base being found (by 33^d prop.) and added to the area of the middle circle EF, and the half of their sum (that is, an arithmetical mean between the area of the base and the area of the middle circle) taken for the base of the vessel, and multiplied into its height, the solid content of the given vessel will be produced.

Note, That the length of the vessel, as well as the diameters of the base, and of the circle EF, ought to be taken within the flaves; for it is the solid content within the flaves that is sought.

PROPOSITION XLVI.

To find the solid content of a given cone.—Let the area of the base (found by prop. 33.) be multiplied into $\frac{1}{3}$ of the height, the product will give the solid content of the cone; for by the 10th 12. Eucl. a cone is the third part of a cylinder that has the same base and height.

PROPOSITION XLVII.

FIG. 24. 25. To find the solid content of a frustum of a cone cut by a plane parallel to the plane of the base.—First, let the height of the entire cone be found, and thence (by the preceding prop.) its solid content; from which subtract the solid content of the cone cut off at the top, there will remain the solid content of the *frustum* of the cone.

How the content of the entire cone may be found, appears thus: Let ABCD be the *frustum* of the cone (either right or scalenous, as in the figures 2. and 3.) let the cone ECD be supposed to be completed; let AG be drawn parallel to DE, and let AH and EF be perpendicular on CD; it will be (by 2^d 6. Eucl.) as CG : CA :: CD : CE; but (by art. 72. of Part. I.) as CA : AH :: CE : EF; consequently (by 22^d 5. Eucl.) as CG : AH :: CD : EF; that is, as the excess of the diameter of the lesser base is to the height of the *frustum*, so is the diameter of the greater base to the height of the entire cone.

COROLLARY.

FIG. 26. Some calks whose flaves are remarkably bended about the middle, and strain towards the ends, may be taken for two portions of cones, without any considerable error. Thus AB EF is a *frustum* of a right cone, to whose base EF, on the other side, there is another similar *frustum* of a cone joined, EDC F. The vertices of these cones, if they be supposed to be completed, will be found at G and H. Whence, (by the

preceding proposition) the solid content of such vessels may be found.

PROPOSITION XLVIII.

FIG. 27. A cylinder circumscribed about a sphere, that is, having its base equal to a great circle of the sphere, and its height equal to the diameter of the sphere, is to the sphere as 3 to 2.

Let ABEC be the quadrant of a circle, and ABDC the circumscribed square; and likewise the triangle ADC; by the revolution of the figure about the right line AC, as axis, a hemisphere will be generated by the quadrant, a cylinder of the same base and height by the square, and a cone by the triangle. Let these three be cut any how by the plane HF, parallel to the base AB; the section in the cylinder will be a circle whose radius is FH, in the hemisphere a circle of the radius EF, and in the cone a circle of the radius GF.

By (art. 69. of Part I.) EAq , or $HFG = EFq$ and FAq taken together, (but $AFq = FGq$, because $AC = CD$); therefore the circle of the radius FH is equal to a circle of the radius EF, together with a circle of the radius GF; and since this is true every where, all the circles together described by the respective radii HF (that is, the cylinder) are equal to all the circles described by the respective radii EF and FG (that is, to the hemisphere and the cone taken together; but, (by the 10th 12. Eucl.) the cone generated by the triangle DAC is one third part of the cylinder generated by the square BC. Whence it follows, that the hemisphere generated by the rotation of the quadrant ABEC is equal to the remaining two third parts of the cylinder, and that the whole sphere is $\frac{2}{3}$ of the double cylinder circumscribed about it.

This is that celebrated 39th prop. 1. book of Archimedes of the sphere and cylinder; in which he determines the proportion of the cylinder to the sphere inscribed to be that of 3 to 2.

COROLLARY.

Hence it follows, that the sphere is equal to a cone whose height is equal to the semidiameter of the sphere, having for its base a circle equal to the superficies of the sphere, or to four great circles of the sphere, or to a circle whose radius is equal to the diameter of the sphere, (by prop. 41. of this.) And indeed a sphere differs very little from the sum of an infinite number of cones that have their bases in the surface of the sphere, and their common vertex in the centre of the sphere; so that the superficies of the sphere, (of whose dimension see prop. 41. of this) multiplied into the third part of the semidiameter, gives the solid content of the sphere.

PROPOSITION XLIX.

FIG. 28. To find the solid content of a sector of the sphere.—A spherical sector ABC (as appears by the corollary of the preceding prop.) is very little different from an infinite number of cones, having their bases in the superficies of the sphere BEC, and their common vertex in the centre. Wherefore the spherical superficies BEC being found, (by prop. 42. of this,) and multiplied into the third part of AB the radius of the sphere, the product will give the solid content of the sector ABC.

COROLLARY.

It is evident how to find the solidity of a spherical segment

segment less than a hemisphere, by subtracting the cone ABC from the sector already found. But if the spherical segment be greater than a hemisphere, the cone corresponding must be added to the sector, to make the segment.

PROPOSITION L.

FIG. 29. *To find the solidity of the spheroid, and of its segments cut by planes perpendicular to the axis.*—

In prop. 44. of this, it is shewn, that every where $EH : EG :: CF : CD$; but circles are as the squares described upon their rays, that is, the circle of the radius EH is to the circle of the radius EG, as CFg to CDg . And since it is so every where, all the circles described with the respective rays EH, (that is, the spheroid made by the rotation of the semi-elliptis AFB around the axis AB,) will be to all the circles described by the respective radii EG, (that is, the sphere described by the rotation of the semicircle ADB on the axis AB,) as ECg to CDg ; that is, as the spheroid to the sphere on the same axis, so is the square of the other axis of the generating ellipse to the square of the axis of the sphere.

And this holds, whether the spheroid be found by a revolution around the greater or lesser axis.

COROLLARY 1.

Hence it appears, that the half of the spheroid, formed by the rotation of the space AHFC around the axis AC, is double of the cone generated by the triangle AFC about the same axis; which is the 32^d prop. of Archimedes of conoids and spheroids.

COROLLARY 2.

Hence, likewise, is evident the measure of segments of the spheroid cut by planes perpendicular to the axis. For the segment of the spheroid made by the rotation of the space ANHE, round the axis AE, is to the segment of the sphere having the same axis AC, and made by the rotation of the segment of the circle AMGE, as CFg to CDg .

But if the measure of this solid be wanted with less labour, by the 34th prop. of Archimedes of conoids and spheroids, it will be as BE to AC+EB; so is the cone generated by the rotation of the triangle AHE round the axis AE, to the segment of the sphere made by the rotation of the space ANHE round the same axis AE; which could easily be demonstrated by the method of indivisibles.

COROLLARY 3.

Hence it is easy to find the solid content of the segment of a sphere or spheroid intercepted between two parallel planes, perpendicular to the axis. This agrees as well to the oblate as to the oblong spheroid; as is obvious.

COROLLARY 4.

FIG. 30. If a cask is to be valued as the middle piece of an oblong spheroid, cut by the two planes DC and FG, at right angles to the axis: first, let the solid content of the half spheroid ABCD be measured by the preceding prop. from which let the solidity of the segment DEC be subtracted, and there will remain the segment ABCD; and this doubled will give the capacity of the cask required.

The following method is generally made use of for finding the solid content of such vessels. The double area of the greatest circle, that is, of that which is de-

scribed by the diameter AB at the middle of the cask, is added to the area of the circle at the end, that is, of the circle DC or FG (for they are usually equal), and the third part of this sum is taken for a mean base of the cask; which therefore multiplied into the length of the cask OP, gives the content of the vessel required.

Sometimes vessels have other figures, different from those we have mentioned; the easy methods of measuring which may be learned from those who practise this art. What hath already been delivered, is sufficient for our purpose.

PROPOSITION LI.

FIG. 31. and 32. *To find how much is contained in a vessel that is in part empty, whose axis is parallel to the horizon.*—Let AGBH be the great circle in the middle of the cask, whose segment GBH is filled with liquor, the segment GAH being empty; the segment GBH is known, if the depth EB be known, and EH a mean proportional between the segments of the diameter AB and EB; which are found by a rod or ruler put into the vessel at the orifice. Let the basis of the cask, at a medium, be found, which suppose to be the circle CKDL; and let the segment KCL be similar to the segment GAH (which is either found by the rule of three, because as the circle AGBH is to the circle CKDL, so is the segment GAH to the segment KCL; or is found from the tables of segments made by authors); and the product of this segment multiplied by the length of the cask will give the liquid content remaining in the cask.

PROPOSITION LII.

To find the solid content of a regular and ordinate body.—A tetraedon being a pyramid, the solid content is found by the 44th prop. The hexaedron, or cube, being a kind of prism, it is measured by the 43^d prop. An octaedron consists of two pyramids of the same square base and of equal heights; consequently its measure is found by the 44th prop. A dodecaedron consists of 12 pyramids having equal equilateral and equiangular pentagonal bases; and so one of these being measured (by the 44th prop. of this) and multiplied by 12, the product will be equal to the solid content of the dodecaedron. The icosaedron consists of 20 equal pyramids having triangular bases; the solid content of one of which being found (by the 44th prop.) and multiplied by 20, gives the whole solid. The bases and heights of these pyramids, if you want to proceed more exactly, may be found by trigonometry. See TRIGONOMETRY.

PROPOSITION LIII.

To find the solid content of a body, however irregular.—Let the given body be immersed into a vessel of water, having the figure of a parallelepipedon or prism, and let it be noted how much the water is raised upon the immersion of the body. For it is plain, that the space which the water fills, after the immersion of the body, exceeds the space filled before its immersion, by a space equal to the solid content of the body, however irregular. But when this excess is of the figure of a parallelepipedon or prism, it is easily measured by the 43^d prop. of this, viz. by multiplying the area of the base, or mouth of the vessel, into the difference of the elevations of the water before and after

after immersion: Whence is found the solid content of the body given.

In the same way the solid content of a part of a body may be found, by immersing that part only in water.

There is no necessity to insist here on diminishing or enlarging solid bodies in a given proportion. It will be easy to deduce these things from the 11th and 12th books of Euclid.

"The following rules are subjoined for the ready computation of the contents of vessels, and of any solids in the measures in use in Great Britain.

"I. To find the content of a cylindric vessel in English wine gallons, the diameter of the base and altitude of the vessel being given in inches and decimals of an inch.

"Square the number of inches in the diameter of the vessel; multiply this square by the number of inches in the height: then multiply the product by the decimal fraction .0034; and this last product shall give the content in wine-gallons and decimals of such a gallon. To express the rule arithmetically; let D represent the number of inches and decimals of an inch in the diameter of the vessel, and H the inches and decimals of an inch in the height of the vessel; then the content in wine-gallons shall be $DDH \times \frac{1}{10000}$, or $DDH \times .0034$. Ex. Let the diameter $D = 51.2$ inches, the height $H = 62.3$ inches, then the content shall be $51.2 \times 51.2 \times 62.3 \times .0034 = 555.27.332$ wine-gallons. This rule follows from prop. 33. and 45. For, by the former, the area of the base of the vessel is in square inches $DD \times .7854$; and by the latter, the content of the vessel in solid inches is $DDH \times .7854$; which divided by 231 (the number of cubical inches in a wine-gallon) gives $DDH \times .0034$, the content in wine-gallons. But though the charges in the excise are made (by statute) on the supposition that the wine-gallon contains 231 cubical inches; yet it is said, that in sale, 224 cubical inches, the content of the standard measured at Guildhall (as was mentioned above), are allowed to be a wine-gallon.

"II. Supposing the English ale-gallon to contain 282 cubical inches, the content of a cylindric vessel is computed in such gallons, by multiplying the square of the diameter of a vessel by its height as formerly, and their product by the decimal fraction .0027,851: that is, the solid content in ale-gallons is $DDH \times .0027,851$.

"III. Supposing the Scots pint to contain about 103.4 cubical inches, (which is the measure given by the standards at Edinburgh, according to experiments mentioned above), the content of a cylindric vessel is computed in Scots pints, by multiplying the square of the diameter of the vessel by its height, and the product of these by the decimal fraction .0076. Or the content of such a vessel in Scots pints is $DDH \times .0076$.

"Supposing the Winchester bushel to contain 2187 cubical inches, the content of a cylindric vessel is computed in those bushels by multiplying the square of the diameter of the vessel by the height, and the product by the decimal fraction .0003,606. But the standard bushel having been measured by Mr Everard and others in 1696, it was found to contain

"only 2145.6 solid inches; and therefore it was enacted in the act for laying a duty upon malt, That every round bushel, with a plain and even bottom, being 18½ inches diameter throughout, and 8 inches deep, should be esteemed a legal Winchester bushel. According to this act (ratified in the first year of queen Anne) the legal Winchester bushel contains only 2150.42 solid inches. And the content of a cylindric vessel is computed in such bushels, by multiplying the square of the diameter by the height, and their product by the decimal fraction .0003,625. Or the content of the vessel in those bushels is $DDH \times .0003,625$.

"V. Supposing the Scots wheat-firlet to contain 21½ Scots pints, (as is appointed by the statute 1618), and the pint to be conform to the Edinburgh standards above mentioned, the content of a cylindric vessel in such firlets is computed by multiplying the square of the diameter by the height, and their product by the decimal fraction .00358. This firlet, in 1426, is appointed to contain 17 pints; in 1457, it was appointed to contain 18 pints; in 1587, it is 19½ pints; in 1628, it is 21½ pints: and though this last statute appears to have been founded on wrong computations in several respects, yet this part of the act that relates to the number of pints in the firlet seems to be the least exceptionable; and therefore we suppose the firlet to contain 21½ pints of the Edinburgh standard, or about 2197 cubical inches; which a little exceeds the Winchester bushel, from which it may have been originally copied.

"VI. Supposing the bear-firlet to contain 31 Scots pints, (according to the statute 1618), and the pint conform to the Edinburgh standards, the content of a cylindric vessel in such firlets is found by multiplying the square of the diameter by the height, and this product by .00245.

"When the section of the vessel is not a circle, but an ellipsis, the product of the greatest diameter by the least, is to be substituted in those rules for the square of the diameter.

"VII. To compute the content of a vessel that may be considered as a *frustum* of a cone in any of those measures.

"Let A represent the number of inches in the diameter of the greater base, B the number of inches in the diameter of the lesser base. Compute the square of A, the product of A multiplied by B, and the square of B, and collect these into a sum. Then find the third part of this sum, and substitute it in the preceding rules in the place of the square of the diameter; and proceed in all other respects as before. Thus, for example, the content in wine-gallons in $AA \times AB \times BB \times \frac{1}{3} \times H \times .0034$.

"Or, to the square of half the sum of the diameters A and B, add one third part of the square of half their difference, and substitute this sum in the preceding rules for the square of the diameter of the vessel; for the square of $\frac{1}{2} A \times \frac{1}{2} B$ added to $\frac{1}{3}$ of the square of $A - B$, gives $\frac{1}{3} AA \times \frac{1}{3} AB \times \frac{1}{3} BB$.

"VIII. When a vessel is a *frustum* of a parabolic conoid, measure the diameter of the section at the

" middle of the height of the *frustum*; and the content will be precisely the same as of a cylinder of this diameter, of the same height with the vessel.

" IX. When a vessel is a *frustum* of a sphere, if you measure the diameter of the section at the middle of the height of the *frustum*, then compute the content of a cylinder of this diameter of the same height with the vessel, and from this subtract $\frac{1}{4}$ of the content of a cylinder of the same height, on a base whose diameter is equal to its height; the remainder will give the content of the vessel. That is, if D represent the diameter of the middle section, and H the height of the *frustum*, you are to substitute $DD - \frac{1}{4} HH$ for the square of the diameter of the cylindric vessel in the first six rules.

" X. When the vessel is a *frustum* of a spheroid, if the bases are equal, the content is readily found by the rule in p. (24.) In other cases, let the axis of the solid be to the conjugate axis as n to 1; let D be the diameter of the middle section of the *frustum*, H the height or length of the *frustum*; and substitute in the first six rules $DD - \frac{HH}{3nn}$ for the square of the diameter of the vessel.

" XI. When the vessel is an hyperbolic conoid, let the axis of the solid be to the conjugate axis as n to 1, D the diameter of the section at the middle of the *frustum*, H the height or length: compute $DD \times \frac{1}{3n} \times HH$, and substitute this sum for the square of the diameter of the cylindric vessel in the first six rules.

" XII. In general, it is usual to measure any round vessel, by distinguishing it into several *frustums*, and taking the diameter of the section at the middle of each *frustum*; thence to compute the content of each, as if it was a cylinder of that mean diameter; and to give their sum as the content of the vessel. From the total content, computed in this manner, they subtract successively the numbers which express the circular areas that correspond to those mean diameters, each as often as there are inches in the altitude of the *frustum* to which it belongs, beginning with the uppermost; and in this manner calculate a table for the vessel, by which it readily appears how much liquor is at any time contained in it, by taking either the dry or wet inches; having regard to the inclination or drip of the vessel, when it has any.

" This method of computing the content of a *frustum* from the diameter of the section at the middle of its height, is exact in that case only when it is a portion of a parabolic conoid; but in such vessels as are in common use, the error is not considerable. When the vessel is a portion of a cone or hyperbolic conoid, the content by this method is found less than the truth; but when it is a portion of a sphere or spheroid, the content computed in this manner exceeds the truth. The difference or error is always the same, in the different parts of the same or of similar vessels, when the altitude of the *frustum* is given. And when the altitudes are different, the error is in the triplicate ratio of the altitude. If exactness be required, the error in measuring the *frustum* of a conical vessel, in this manner, is $\frac{1}{4}$ of the content of a cone

" similar to the vessel, of an altitude equal to the height of the *frustum*. In a sphere, it is $\frac{1}{4}$ of a cylinder of a diameter and height equal to the *frustum*. In the spheroid and hyperbolic conoid, it is the same as in a cone generated by the right-angled triangle, contained by the two semiaxes of the figure, revolving about that side which is the semiaxis of the *frustum*.

" In the usual method of computing a table for a vessel, by subtracting from the whole content the number that expresses the uppermost area, as often as there are inches in the uppermost *frustum*, and afterwards the numbers for the other areas successively; it is obvious, that the contents assigned by the table, when a few of the uppermost inches are dry, are stated a little too high, if the vessel stands on its lesser base, but too low when it stands on its greater base; because, when one inch is dry, for example, it is not the area at the middle of the uppermost *frustum*, but rather the area at the middle of the uppermost inch, that ought to be subtracted from the total content, in order to find the content in this case.

" XIII. To measure round timber: Let the mean circumference be found in feet and decimals of a foot; square it; multiply this square by the decimal .079,577, and the product by the length. Ex. Let the mean circumference of a tree be 10 3 feet, and the length 24 feet. Then $10 3 \times 10 3 \times .079,577 \times 24 = 202.615$, is the number of cubical feet in the tree. The foundation of this rule is, that when the circumference of a circle is 1, the area is .0795,774,715, and that the areas of circles are as the squares of their circumferences.

" But the common way used by artificers for measuring round timber, differs much from this rule. They call one fourth part of the circumference the *girt*, which is by them reckoned the side of a square, whose area is equal to the area of the section of the tree; therefore they square the *girt*, and then multiply by the length of the tree. According to their method, the tree of the last example would be computed at 159.13 cubical feet only.

" How square timber is measured, will be easily understood from the preceding propositions. Fifty solid feet of hewn timber, and forty of rough timber, make a load.

" XIV. To find the burden of a ship, or the number of tons it will carry, the following rule is commonly given. Multiply the length of the keel taken within board, by the breadth of the ship within board, taken from the midship beam from plank to plank, and the product by the depth of the hold, taken from the plank below the keelson to the under part of the upper deck plank, and divide the product by 94, the quotient is the content of the tonnage required. This rule however cannot be accurate; nor can one rule be supposed to serve for the measuring exactly the burden of ships of all sorts. Of this the reader will find more in the Memoirs of the Royal Academy of Sciences at Paris, for the year 1721.

" Our author having said nothing of weights, it may be of use to add briefly, that the English Troy-

" Troy-pound contains 12 ounces, the ounce 20 penny-weight, and the penny-weight 24 grains; that the Averdupois pound contains 16 ounces, the ounce 16 drams, and that 112 pounds is usually called the hundred weight. It is commonly supposed, that 14 pounds Averdupois are equal to 17 pounds Troy. According to Mr Everard's experiments, 1 pound Averdupois is equal to 14 ounces 12 penny-weight and 16 grains Troy, that is, to 7000 grains; and an Averdupois ounce is 437½ grains. The Scots Troy-pound (which, by the statute 1718, was to be the same with the French) is commonly supposed equal to 15½ ounces English Troy, or 7560 grains. By a mean of standards kept by the dean of guild at Edinburgh, it is 7599½ or 7600 grains. They who have measured the weights

" which were sent from London, after the union of the kingdoms, to be the standards by which the weights in Scotland should be made, have found the English Averdupois pound (from a medium of the several weights) to weigh 7000 grains, the same as Mr Everard; according to which, the Scots, Paris, or Amsterdam pound, will be to the pound Averdupois as 38 to 35. The Scots Troy-lbne contains 16 pounds, the pound 2 marks or 16 ounces, an ounce 16 drops, a drop 36 grains. Twenty Scots ounces make a Tron-pound; but because it is usual to allow one to the score, the Tron-pound is commonly 21 ounces. Sir John Skene, however, makes the Tron-lbne to contain only 19½ pounds."

George.

G E O

G E O

George.

GEORGE I. II. and III. kings of Great Britain. —George I. the son of Ernest Augustus, duke of Brunfwick Lunenburgh, and elector of Hanover; succeeded to the throne of Great Britain in 1714, in virtue of an act of parliament, passed in the latter part of the reign of king William III. limiting the succession of the crown, after the demise of that monarch, and queen Anne (without issue), to the princess Sophia of Hanover, and the heirs of her body, being Protestants. —George II. the only son of the former, succeeded him in 1727, and enjoyed a long rein of glory; dying amidst the most rapid and extensive conquests in the 77th year of his age. He was succeeded by his grandson George III. our present sovereign. For particulars, see BRITAIN, n° 369, —458.

GEORGE, or *Knights of St GEORGE*, has been the denomination of several military orders, whereof that of the garter is one of the most illustrious. See GARTER.

King GEORGE's Islands, are two islands in the South Sea, lying in W. Long. 144. 56. S. Lat. 14. 28. They were first discovered by commodore Byron in 1765, and have since been visited by Captain Cook in 1774. Commodore Byron's people had an encounter with the inhabitants, which proved fatal to some of the natives; but Captain Cook was more fortunate. A lieutenant and two boats well armed were sent on shore by Captain Cook; and landed without opposition. As soon as the gentlemen landed, the islanders embraced them by touching noses, a mode of civility used in New Zealand, which is 900 leagues distant, and the only place besides this where the custom has been observed to prevail. Notwithstanding this ceremony, however, very little real friendship seemed to take place on the part of the islanders. They crowded about the boats as the people were stepping into them, and seemed in doubt whether they should detain them or let them go; at last, however, not thinking themselves sufficiently strong, they seemed contented with their departure, and assisted them in pushing off their boats; but some of the most turbulent threw stones into the water which fell very near them, and all seemed to glory that they had as it were driven them off. The British, however, brought off five dogs of a white colour with fine long hair, with which the island seemed to be plentifully supplied. These they purchased with small nails, and some ripe bananas which had been brought from the Marquesas.

On this island Mr Forester found a kind of scurvy-grass, which the natives informed him they were wont to bruise and mix with shell-fish; after which, they threw it into the sea whenever they perceived a shoal of fish. This preparation intoxicates them for some time; and thus they are caught on the surface of the water without any other trouble than that of taking them out. The name of this plant among the natives is *e novu*. The largest island, which they call *Tiookea*, is something of an oval shape, and about ten leagues in circuit; the other island, which lies two leagues to the westward of Tiookea, is four leagues long from north-east to south-west, and from five to three miles long. The soil of both is extremely scanty; the foundation consists of coral, very little elevated above the surface of the water.

St GEORGE del Mina, the capital of the Dutch settlements, on the gold-coasts of Guinea, situated seven or eight miles west of Cape-coast castle, the capital of the British settlements there. W. Long. 5° and N. Lat. 5°.

St GEORGE, a fort and town of Asia, in the peninsula on this side the Ganges, and on the coast of Coromandel, belonging to the English; it is otherwise called *Madrasi*, and by the natives *Chili-palam*. It fronts the sea, and has a salt-water river on its back side, which hinders the fresh-water springs from coming near the town, so that they have no good water within a mile of them. In the rainy seasons it is incommoded by inundations; and from April to September it is so scorching hot, that if the sea-breezes did not cool the air, there would be no living there. There are two towns, one of which is called the *White Town*, which is walled round, and has several bulwarks and bastions to defend it: it is 400 paces long and 150 broad, and is divided into regular streets. Here are two churches, one for the Protestants, and the other for the Papists; as also a good hospital, a town-hall, and a prison for debtors. They are a corporation, and have a mayor and aldermen, with other proper officers. The *Black Town* is inhabited by Gentoos, Mahometans, and Portuguese and Armenian Christians, and each religion have their temples and churches. This, as well as the White Town, is ruled by the English governor and his council. The diamond-mines are but a week's journey from this place, which renders them pretty plentiful,

but there are no large ones since that great diamond was procured by governor Pitt. This colony produces very little of its own growth or manufacture for foreign markets, and the trade is in the hands of the Armenians and Gentoos. The chief things the British deal in, besides diamonds, are calicoes, chintz, muslins, and the like. This colony may consist of 80,000 inhabitants in the towns and villages, and there are generally 400 or 500 Europeans. Their rice is brought by sea to Gangam and Oriza, their wheat from Surat and Bengal, and their fire-wood from the islands of Diu: so that an enemy, with a superior force at sea, may easily distress them. The houses of the White Town are built with brick, and have lofty rooms and flat roofs; but the Black Town consists chiefly of thatched cottages. The military power is lodged in the governor and council, who are also the last resort in civil causes. The company have two chaplains, who officiate by turns, and have each 100*l.* a-year, besides the advantages of trade. They never attempt to make proselytes, but leave that to the Popish missionaries. The salaries of the company's writers are very small: but, if they have any fortune of their own, they may make it up by trade; which must generally be the case, for they commonly grow rich. It was taken by the French in 1746, who restored it to the peace of Aix la Chapelle.

St GEORGE'S, the largest of the Bermuda or Summer islands. W. Long. 65. 10. N. Lat. 32. 30.

Cross of St GEORGE, a red one in a field argent, which makes part of the British standard.

GEORGIA, a country of Asia, subject to the Turks. It is bounded on the north by Circassia, on the east by Daghestan and Shirvan, on the south by Armenia, and on the west by the Euxine or Black Sea; comprehending the greatest part of the ancient Colchis, Iberia, and Albania. About the etymon of the name of this country, authors are not agreed. The most probable opinion is, that it is a corruption softening of *Kurgia*, from the river Kur; whence also it is supposed that the inhabitants are called by the Persians indifferently *Georgi*, *Gurgi*, and *Kurgi*; and the country *Kurgistan* and *Gurgistan*: It is divided by a ridge of mountains into eastern and western; the former of which is again subdivided into the kingdoms of Caket, Carduel or Carthuel, and Goguetia; and the latter into the provinces of Abcassia, Mireta, or Imaretta, and Guriel. Another division is into Georgia Proper, Abcassia, and Mingrelia.

"Georgia (says Sir John Chardin) is as fertile a country as can be seen; the bread is as good here as in any part of the world; the fruit of an exquisite flavour, and of different sorts; no place in Europe yields better pears and apples, and no place in Asia better pomegranates. The country abounds with cattle, venison, and wild-fowl, of all sorts; the river Kuris is well stocked with fish; and the wine is so rich, that the king of Persia has always some of it for his own table. The inhabitants are robust, valiant, and of a jovial temper; great lovers of wine, and esteemed very trusty and faithful; endowed with good natural parts, but, for want of education, very vicious. The women are generally so fair and comely, that the wives and concubines of the king of Persia and his court are for the most part Georgian women. Nature has adorned them

with graces no where else to be met with; it is impossible to see them without loving them; they are of a good size, clean-limbed, and well-shaped." Another traveller, however, of no mean character, thus expresses himself with respect to the women: "As to the Georgian women, they did not at all surprize us; for we expected to find them perfect beauties. They are, indeed, no way disagreeable; and may be counted beauties, if compared with the Curdes. They have an air of health that is pleasing enough; but, after all, they are neither so handsome nor so well shaped as is reported. Those who live in the towns have nothing extraordinary, more than the others; so that I may, I think, venture to contradict the accounts that have been given of them by most travellers."

Georgia abounds with woods and mountains, intermixed with a great number of beautiful plains.

The only rivers of note in this country are the Cyrus, Cyrrus, Corus, or Kur, and the Aragus. The first springs from the Moschian mountains, which separate Colchis from Armenia, waters the country now called *Mokan*, and, after receiving into its channel the Aragus and Araxes, falls by one mouth into the Caspian sea. This river is navigable the greatest part of its course. The Aragus springs from the mountains that separate Iberia from Colchis, and falls into the Cyrus.

Iberia, or Georgia, is tributary or subject either to the Porte or the king of Persia, and known to the Persians by the name of Gurgistan, that is, "the land of the Georgians;" for *tanis* is an ancient Celtic word, signifying a country, and still in use among the eastern nations, as appears from the modern names of Curdestan, Indostan, &c. that is, the country of the Curdes, of the Indians, &c.

The whole country of Georgia is but thinly inhabited, and has but very few cities in proportion to its extent and fertility; which is doubtless in a great measure owing to the barbarous and unnatural traffic carried on here in boys and girls, parents selling their children, masters their servants, and lords their vassals and tenants. Every one, in short, trades in the males and females he is master of, and disposes of them to the Turks and Persians, who employ them in their armies and seragios, as slaves, mutes, eunuchs, soldiers, statesmen, and concubines, according to their capacities, and the favour they have obtained with their masters.

This country formerly abounded with great cities, as appears not only from its history, but from the ruins of many of them still visible, which shew that they must have been very large, opulent, and magnificently built. These were all destroyed by the inundations of northern barbarians from mount Caucasus, as the A-lans, Huns, Suevi, and some others, so much noted in history for their strength, courage, and conquests.

The air of Georgia is serene, dry, and healthful; but very cold in winter, and hot in summer.

The fine weather commonly begins about May, and lasts till November. But the lands want a good deal of watering to make them produce a plentiful crop; when they yield all sorts of grain, fruit, and pulse, in abundance, which sell at so cheap a rate that the people want for nothing. The cattle, both small and great, are fat and good, and in great numbers; but the common

Georgia. mon people live mostly on swine's flesh, which is every where excellent, and, by their own account, wholesome and of easy digestion. The river Kur, as well as the Caspian sea, which lies east of Georgia, supplies it with plenty and variety of fish.

The mountains of Caucasus, that lie partly in this country, are known at present to the inhabitants by the names of *Cochas* and *Cochias*, which are, without doubt, a corruption of the ancient. The Arabs call them the *Mountains of Raf*.

The inhabitants are civil enough to strangers, allowing them to live and trade as they please, and to profess what religion they have a mind: hence people of various nations are seen here, as Turks, Armenians, Persians, Jews, Greeks, Indians, Tartars, Russians, and other Europeans. But the Armenians are the most numerous; and, by carrying on the greatest part of the trade, are also the richest; for which reason the Georgians hate and despise them, regarding them in much the same light as the Europeans do the Jews. The Georgians wear four caps on their heads, and a kind of long vest, open before, but which may be buttoned at pleasure; their breeches and under-garments are like those of the Persians, as is the entire dress of the women.

Their houses, especially those of the better sort, are also after the model of those of Persia, as well as all their public buildings: and they may afford to have them built after the best manner, having not only stone, wood, plaster, lime, and all other materials, in the greatest plenty and cheapness; but also can have the most laborious work done by their own vassals, over whom they have such an absolute power, that they can keep them employed whole months together, without allowing them either wages or food.

Iberia, or Georgia, according to Josephus, was first peopled by Tubal, the brother of Gomer and Magog. His opinion is confirmed by the Septuagint; for Meshech and Tubal are by these interpreters rendered *Moschi* and *Iberians*. We know little of the history of the country till the reign of Mithridates, when their king, named *Artocius*, siding with that prince against Lucullus, and afterwards against Pompey, was defeated by the latter, with great slaughter; but afterwards obtained a peace, upon delivering up his sons as hostages. Little notice is taken of the succeeding kings by the ancient historians. They were probably tributary to the Romans till that empire was overturned, when this, with the other countries in Asia bordering on it, fell successively under the power of the Saracens and Turks. A certain prince of Georgia, named *Heraclius*, has lately made a great noise, and a considerable progress in his endeavours to shake off the Turkish yoke, having, according to advices from the east, several times defeated the Ottoman troops: but it seems either his former good fortune forsook him, or an accommodation took place; for all the intelligence from that part of the world, for some time past, hath been entirely silent with regard to him.

The capital of the country is *TEFLIS*; for an account of which, see that article.

GEORGIA, one of the provinces of the British empire in America, lying between South Carolina and Florida. It extends 120 miles upon the sea-coast, and 300 miles from thence to the Apalachian moun-

tains, and its boundaries to the north and south are the rivers Savannah and Altamaha. The British ministry had been long desirous of erecting a colony on this tract of country, that was considered as dependent upon Carolina. One of those influences of benevolence, which liberty, the source of every patriotic virtue, renders more frequent in Britain than in any other country, served to determine the views of government with regard to this place. A rich and humane citizen, at his death, left the whole of his estate to set at liberty such insolvent debtors as were detained in prison by their creditors. Prudential reasons of policy concurred in the performance of this will dictated by humanity; and the government gave orders, that such unhappy prisoners as were released, should be transplanted into that desert country, which was now intended to be peopled. It was named *Georgia*, in honour of the reigning sovereign.

The parliament added 9,843 l. 15 s. to the estate left by the will of a citizen; and a voluntary subscription produced a much more considerable sum. General Oglethorpe was fixed upon to direct these public finances, and to carry into execution so excellent a project. He chose to conduct, himself, the first colonists that were sent to Georgia; where he arrived in January 1733, and fixed his people on a spot ten miles distant from the sea, in an agreeable and fertile plain on the banks of the Savannah. This rising settlement was called *Savannah*, from the name of the river; and inconsiderable as it was in its infant state, was, however, to become the capital of a flourishing colony. It consisted at first of no more than 100 persons; but before the end of the year the number was increased to 618, of whom 127 had emigrated at their own expence. Three hundred men, and 113 women, 102 lads, and 83 girls, formed the beginning of this new population, and the hopes of a numerous posterity.

This settlement was increased in 1735 by the arrival of some Scotch Highlanders. Their national courage induced them to accept an establishment offered them upon the borders of the Altamaha, to defend the colony, if necessary, against the attacks of the neighbouring Spaniards. Here they built the towns of *Darien* and *Frederica*, and several of their countrymen came over to settle among them.

In the same year, a great number of Protestants driven out of Saltzburg by a fanatical priest, embarked for Georgia to enjoy peace and liberty of conscience. At first they settled on a spot just above that of the infant colony; but they afterwards chose to be at a greater distance, and to go as far down as the mouth of the Savannah, where they built a town called *Ebenezer*.

Some Switzers followed the example of these wise Saltzburgers, though they had not, like them, been persecuted. They also settled on the banks of the Savannah; but at the distance of 34 miles from the Germans. Their colony consisting of 100 habitations, was named *Purifburgh*, from Pury their founder; who having been at the expence of their settlement, was deservedly chosen their chief, in testimony of their gratitude to him.

In these four or five colonies, some men were found more inclined to trade than agriculture. These, there-

Royal's
Hist.

fore, separated from the rest in order to build the city Augusta, 236 miles distant from the ocean. The goodness of the soil, though excellent in itself, was not the motive of their fixing upon this situation; but they were induced to it by the facility it afforded them of carrying on the peltry trade with the savages. Their project was so successful, that, as early as the year 1739, 600 people were employed in this commerce. The sale of these skins was carried on with the greater facility from the circumstance of the Savannah admitting the largest ships to sail upon it as far as the walls of Augusta.

The mother-country ought, one would imagine, to have formed great expectations from a colony, where she had sent near 5000 men, and laid out 64,968 l. exclusive of the voluntary contributions that had been raised by zealous patriots. But to her great surprise she received information in 1741, that there remained scarce a sixth part of that numerous colony sent to Georgia; who being now totally discouraged, seemed only desirous to fix in a more favourable situation. The reasons of these calamities were inquired into and discovered.

This colony, even in its infancy, brought with it the seeds of its decay. The government, together with the property of Georgia had been ceded to individuals. The first use that the proprietors of Georgia made of the unlimited power they were invested with was to establish a system of legislation, that made them entirely masters not only of the police, justice, and finances, of the country, but even of the lives and estates of its inhabitants. Every species of right was withdrawn from the people, who are the original possessors of them all. Obedience was required of the people, though contrary to their interest and knowledge; and it was considered here, as in other countries, as their duty and their fate.

As great inconveniences had been found to arise in other colonies from large possessions, it was thought proper in Georgia to allow each family only 50 acres of land; which they were not permitted to mortgage, or even to dispose of by will to their female issue. This last regulation of making only the male issue capable of inheritance, was soon abolished; but there still remained too many obstacles to excite a spirit of emulation. It seldom happens, that a man resolves to leave his country but upon the prospect of some great advantage that works strongly upon his imagination. All limits, therefore, prescribed to his industry, are so many checks which prevent him from engaging in any project. The boundaries assigned to every plantation must necessarily have produced this bad effect. Several other errors still affected the original plan of this country, and prevented its increase.

The taxes imposed upon the most fertile of the British colonies, are very inconsiderable; and even these are not levied till the settlements have acquired some degree of vigour and prosperity. From its infant state, Georgia had been subjected to the fines of a feudal government, with which it had been as it were fettered. The revenues raised by this kind of service increased prodigiously, in proportion as the colony extended itself. The founders of it, blinded by a spirit of avidity, did not perceive that the smallest duty imposed upon the trade of a populous and flourishing

province, would much sooner enrich them than the largest fines laid upon a barren and uncultivated country.

To this species of oppression was added another, which, however incredible it may appear, might arise from a spirit of benevolence. The planters in Georgia were not allowed the use of slaves. Carolina and some other colonies having been established without their assistance, it was thought that a country destined to be the bulwark of those African possessions ought not to be peopled by a set of slaves, who could not be in the least interested in the defence of their oppressors. But it was not at the same time foreseen, that colonists, who were less favoured than their neighbours by the mother-country, who were situated in a country less susceptible of tillage, and in a hotter climate, would want strength and spirit to undertake a cultivation that required greater encouragement.

The indolence which so many obstacles gave rise to, found a further excuse in another prohibition that had been imposed. The disturbances produced by the use of spirituous liquors over all the continent of North America, induced the founders of Georgia to forbid the importation of rum. This prohibition, though well intended, deprived the colonists of the only liquor that could correct the bad qualities of the waters of the country, which were generally unwholesome; and of the only means they had to restore the waste of strength and spirits that must be the consequence of incessant labour. Besides this, it prevented their commerce with the Antilles; as they could not go thither to barter their wood, corn, and cattle, that ought to have been their most valuable commodities, in return for the rum of those islands.

The mother-country at length perceived how much these defects in the political regulations and institutions had prevented the increase of the colony, and freed them from the restraints they had before been clogged with. The government in Georgia was settled upon the same plan as that which had rendered Carolina so flourishing; and, instead of being dependent on a few individuals, became one of the national possessions.

GEORGIA *Southern*. See AMERICA, n° 20.

GEORGIC, a poetical composition upon the subject of husbandry, containing rules therein, put into a pleasing dress, and set off with all the beauties and embellishments of poetry. The word is borrowed from the Latin *georgicus*, and that of the Greek *γεωργικός*, of *γῆ, terra*, "earth," and *εργον, opus*, "I work, or labour," of *εργον, opus*, "work."

Hesiod and Virgil are the two greatest masters in this kind of poetry.

The moderns have produced nothing in this kind, except Rapin's book of Gardening; and the celebrated poem entitled Cyder, by Mr Phillips, who, if he had enjoyed the advantage of Virgil's language, would have been second to Virgil in a much nearer degree.

GERANITES, in natural history, an appellation given to such of the semipellucid gems as are marked with a spot resembling a crane's eye.

GERANIUM, crane's bill; a genus of the decandria order, belonging to the monodelphia class of plants. There are 57 species; the most remarkable of which are, 1. The Pratenese, with a crowfoot leaf, and

Gerard
Gerbier.

and large blue flowers, a native of many parts of Britain, growing in moist meadows, but is often planted in gardens on account of the beauty of its flowers. Of this there are two varieties, with white, and variegated flowers. 2. The fanguineum, a native of Germany and Switzerland, with deep-red or purple flowers from the side of the branches, one upon each foot-stalk. Of this there are several varieties, differing from one another chiefly in the figure of the stalks and leaves. 3. The phœum, a native of the Alps and Helvetian mountains, with blackish purple flowers, two upon each footstalk. 4. The nodofum, a native of France, with pale purple flowers, two upon each footstalk. 5. The macrorrhizum, or sweet-smelling geranium, a native of Germany and Switzerland, with beautiful purple flowers. 6. The striatum, with white flowers, beautifully variegated with purple. 7. The zonale, a native of the Cape of Good Hope, with an hairy lady's-mantle leaf, red flowers, and a shrubby stalk branching six or eight feet high.

The first six species are hardy plants, with fibrous perennial roots, and annual stalks which rise from the root in spring. The flowers come out in May, June, and July; and are extremely numerous, each consisting of five small spreading petals. These are succeeded by plenty of seed in August and September; which, if permitted to scatter, will raise an abundant crop of young plants. They may also be propagated by parting the roots. The last sort is that most commonly cultivated in gardens; but being a native of a warm climate, will not bear the open air here in the winter-time. There is a variety of this species, which is particularly valued on account of its finely variegated leaves.

GERARD (John), a learned Lutheran divine, was professor of divinity, and rector of the academy of Jena, the place of his birth. He wrote, 1. The harmony of the Eastern languages; 2. A treatise on the Coptic church; and other works which are esteemed. He died in 1668.

GERARDE (John), a surgeon in London, and the greatest botanist of his time, was many years chief gardener to Lord Burleigh; who was himself a great lover of plants, and had the best collection of any nobleman in the kingdom, among which were a great number of exotics introduced by Gerarde. In 1597 he published his *Herbal*, which was printed at the expense of J. Norton, who procured the figures from Franckfort. In 1663, Thomas Johnson, an apothecary, published an improved edition of Gerarde's book; which met with such approbation by the University of Oxford, that they conferred on him the degree of doctor of physic; and it is still much esteemed. The descriptions in the herbal are plain and familiar; and both these authors have laboured more to make their readers understand the characters of the plants, than to inform them that they themselves understood Greek and Latin.

GERBIER, (Sir Balthazar), a painter of Antwerp, born in the year 1592, distinguished himself by painting small figures in distemper. King Charles I. was so pleased with his performances, that he invited him to his court, where he obtained the esteem of the Duke of Buckingham, and grew into great favour. He was not only knighted, but sent to Brussels, where he long resided as agent for the king of Great Britain.

GERM, among gardeners. See GEMMA.

GERMAN, in genealogy, denotes *entire* or *whole*; thus, a brother-german is one both by the father's and mother's side; and cousins-german are the children of brothers or sisters.

GERMAN, or *Germanic*, also denotes any thing belonging to Germany; as the German empire, German flute, &c.

GERMANDER, in botany. See the article TEUCRIUM.

GERMANICUS CÆSAR, the son of Drusus, and paternal nephew to the emperor Tiberius, who adopted him; a renowned general, but still more illustrious for his virtues. He took the title of *Germanicus* from his conquests in that country; and though he had the moderation to refuse the empire offered to him by his army, Tiberius, jealous of his success, and of the universal esteem he acquired, caused him to be poisoned, A. D. 29, aged 34. He was a protector of learning; and composed some Greek comedies and Latin poems, some of which are still extant.

GERMANY, a very extensive empire of Europe, but which, in different ages of the world, hath had very different limits. Its name, according to the most probable conjecture, is derived from the Celtic words *Ghar man*, signifying a warlike man, to which their other name, *Allman*, or *Aleman*, likewise alludes.

The ancient history of the Germans is altogether wrapped up in obscurity; nor do we, for many ages, know any thing more of them, than what may be learned from the history of their wars with the Romans. The first time we find them mentioned by the Roman historians, is about the year 211 B. C. at which time Marcellus subdued Insurbia and Liguria, and defeated the Gælatæ, a German nation, situated on the banks of the Rhine. From this time history is silent with regard to any of these northern nations, till the eruption of the Cimbri and Teutones, who inhabited the most northerly parts of Germany. The event of their enterprise is related under the articles AMBRONES, CIMBRI, and TEUTONES. We must not, however, imagine, because these people happened to invade Italy at the same time, that therefore their countries were contiguous to one another. The Cimbri and Teutones only, dwelt beyond the Rhine; while the Ambrones inhabited the country between Switzerland and Provence. It is indeed very difficult to fix the limits of the country called *Germany* by the Romans. The southern Germans were intermixed with the Gauls, and the northern ones with the Scythians; and thus the ancient history of the Germans includes that of the Dacians, Huns, Goths, &c. till the destruction of the western Roman empire by them. Ancient Germany, therefore, we may reckon to have included the northern part of France, the Netherlands, Holland, *Germany* so called at present, Denmark, Prussia, Poland, Hungary, part of Turkey in Europe, and Muscovy.

The Romans divided Germany into two regions; Belgic or Lower Germany, which lay to the southward of the Rhine; and Germany Proper, or High Germany. The first lay between the rivers Seine and the Rhine; and in this we find a number of different nations, the most remarkable of which were the following.

Germ
Germany.Limits of
ancient
Germany.Nations in-
habiting
Lower Ger-
many.

Germany.

1. The Ubii, whose territory lay between the Rhine and the Mosæ, and whose capital was the city of Cologne. 2. Next to them were the Tungri, supposed to be the same whom Cæsar calls *Eburones* and *Condrusi*; and whose metropolis, then called *Attuatica*, has since been named *Tongres*. 3. Higher up from them, and on the other side of the Moselle, were the Treviri, whose capital was Augusta Trevirorum, now *Triers*. 4. Next to them were the Tribocci, Nemetes, and Vangiones. The former dwelt in Alsace, and had Argentoratum, now *Strasbourg*, for their capital; the others inhabited the cities of Worms, Spire, and Mentz. 5. The Mediomatrici were situated along the Moselle, about the city of Metz in Lorraine; and above them were situated another German nation, named *Raurici*, *Rauraci*, or *Rauriaci*, and who inhabited that part of Helvetia, or Switzerland, about Basil. To the westward and southward of these were the Nervii, Sueffones, Silvanectes, Leuci, Rhemi, Lingones, &c. who inhabited Belgic Gaul.

Between the heads of the Rhine and Danube were seated the ancient kingdom of Vindelicia, whose capital was called *Augusta Vindelicorum*, now *Augsburg*. Below it on the banks of the Danube were the kingdoms of Noricum and Pannonia. The first of these was divided into Noricum *Ripense* and *Mediterraneum*. It contained a great part of the provinces of Austria, Styria, Carinthia, Tyrol, Bavaria, and some others of less note. The latter contained the kingdom of Hungary, divided into Upper and Lower; and extending from Illyricum to the Danube, and the mountains Cætii in the neighbourhood of *Vindebana*, now *Vienna*.

³
Nations in-
habiting
High Ger-
many.

Upper or High Germany lay beyond the Rhine and the Danube. Between the Rhine and the Elbe were the following nations. 1. The Chauci, Upper and Lower; who were divided from each other by the river *Weser*, now the *Wefer*. Their country contained what is now called *Bremen*, *Lunenburg*, *Friesland*, and *Groningen*. The upper Chauci had the *Che-rusei*, and the lower the *Chamavi* on the south-east, and the German Ocean on the north-west. 2. The Frisii, upper and lower, were divided from the lower Chauci by the river *Amisæ*, now the *Ems*; and from one another by an arm of the Rhine. Their country still retains the name of *Friesland*, and is divided into east and west; but the latter is now dismembered from Germany, and become one of the Seven United Provinces. 3. Beyond the *Ise*la, now the *Ise*, which bounded the country of the Frisii, were situated the *Bructeri*, who inhabited that tract now called *Broek-morland*; and the *Marfi*, about the river *Luppe*. On the other side of that river were the *Uspii* or *Uspites*; but these were famed for often changing their territories, and therefore found in other places. 4. Next to these were the *Juones*, or inhabitants of *Juliers*, between the *Maese* and the *Rhine*. 5. The *Catti*, another ancient and warlike nation, inhabited *Hesse* and *Thuringia*, from the *Hartzian* mountains to the *Rhine* and *Weser*; among whom were comprehended the *Mattiaci*, whose capital is by some thought to be *Mar-purg*, by others *Baden*. 6. Next to these were the *Seducii*, bordering upon *Susbia*; *Narisci*, or the ancient inhabitants of *Northgow*, whose capital was *Nu-remberg*; and the *Marcomanni*, whose country an-

ciently reached from the Rhine to the head of the Danube, and to the Neckar. The *Marcomanni* afterwards went and settled in *Bohemia* and *Moravia*, under their general or king *Maroboduus*; and some of them in *Gaul*, whence they drove the *Boii*, who had feated themselves there. 7. On the other side of the *Danu-be*, and between the *Rhine* and it, were the *Hermunduri*, who possessed the country now called *Mis-sia* in *Upper Saxony*; though some make their territories to have extended much farther, and to have reached quite to, or even beyond, the kingdom of *Bohemia*, once the feat of the *Boii*, whence its name. 8. Beyond them, on the north of the *Danube*, was another feat of the *Marcomanni* along the river *Albis*, or *Elbe*. 9. Next to *Bohemia* were situated the *Quadi*, whose territories extended from the *Danube* to *Moravia*, and the northern part of *Austria*. These are comprehended under the ancient name of *Sævi*; part of whom at length forced their way into *Spain*, and settled a kingdom there. 10. Eastward of the *Quadi* were situated the *Bastarnæ*, and parted from them by the *Granna*, now *Gran*; a river that falls into the *Danube*, and by the *Carpathian* mountains, from them called *Alpes Bas-tarnicæ*. The country of the *Bastarnæ* indeed made part of the *European Sarmatia*, and so was without the limits of *Germany* properly so called; but we find these people so often in league with the *German* nations, and joining them for the destruction of the *Romans*, that we cannot but account them as one people.

Between those nations already taken notice of, seated along the other side of the *Danube* and the *Hercynian* forest, were several others whose exact situation is uncertain, viz. the *Martingi*, *Burii*, *Borades*, *Lygii*, or *Logiones*, and some others, who are placed by our geographers along the feated above-mentioned, between the *Danube* and the *Vistula*.

On this side the *Hercynian* forest, were the famed *Rhætii*, now *Grisons*, seated among the *Alps*. Their country, which was also called *Western Illyricum*, was divided into *Rhætia Prima* or *Propria*, and *Secunda*; and was then of much larger extent, spreading itself towards *Susbia*, *Bavaria*, and *Austria*.

On the other side of the *Hercynian* forest, were, 1. The *Sævi*, who spread themselves from the *Vistula* to the river *Elbe*. 2. The *Longobardi*, so called, according to some, on account of their wearing long beards; but, according to others, on account of their consisting of two nations, viz. the *Bardi* and *Lingones*. These dwelt along the river *Elbe*, and bordered southward on the *Chauci* above-mentioned. 3. The *Burgundi*, of whose original feat we are uncertain. 4. The *Semnones*; who, about the time of *Tiberius*, were seated on the river *Elbe*. 5. The *Angles*, *Saxons*, and *Goths*; were probably the descendants of the *Cimbri*; and inhabited the countries of *Denmark*, along the *Baltic* sea, and the peninsula of *Scandinavia*, containing *Norway*, *Sweden*, *Lapland*, and *Finmark*. 6. The *Vandals* were a *Gothic* nation, who, proceeding from *Scandinavia*, settled in the countries now called *Mecklenburgh* and *Brandenburgh*. 7. Of the same race were the *Dacians*, who settled themselves in the neighbourhood of *Palus Mæotis*, and extended their territories along the banks of the *Danu-be*.

These

Germany.

Germany.

4
Wars of the
Scordisci
with the
Romans.

These were the names of the German nations who performed the most remarkable exploits in their wars with the Romans. Besides these, however, we find mention made of the Scordisci, a Thracian nation, who afterwards settled on the banks of the Danube. About the year 113 B. C. they ravaged Macedonia, and cut off a whole Roman army sent against them; the general, M. Porcius Cato, grandson to Cato the censor, being the only person who had the good fortune to make his escape. After this, they ravaged all Thessaly; and advanced to the coasts of the Adriatic, into which, because it stopped their farther progress, they discharged a shower of darts. By another Roman general, however, they were driven back into their own country with great slaughter; and, soon after, Metellus weakened them by repeated defeats, that they were incapable, for some time, of making any more attempts on the Roman provinces. At last, in the consulship of M. Livius Drusus and L. Calpurnius Piso, the former prevailed on them to pass the Danube, which thenceforth became the boundary between the Romans and them. Notwithstanding this, in the time of the Jugurthine war, the Scordisci repassed the Danube on the ice, every winter, and being joined by the Triballi a people of Lower Mæsia, and the Daci of Upper Mæsia, penetrated as far as Macedonia, committing every where dreadful ravages. So early did these northern nations begin to be formidable to the Romans, even when they were most renowned for warlike exploits.

5
Expedition
of Julius
Cæsar into
Germany.

Till the time of Julius Cæsar, however, we hear nothing more concerning the Germans. About 58 years B. C. he undertook his expedition into Gaul; during which, his assistance was implored by the Ædui, against Ariovistus, a German prince who oppressed them. Cæsar, pleased with this opportunity of increasing his power, invited Ariovistus to an interview; but this being declined, he next sent deputies desiring him to restore the hostages he had taken from the Ædui, and to bring no more troops over the Rhine into Gaul. To this a haughty answer was returned; and a battle soon after ensued, in which Ariovistus was entirely defeated, and with great difficulty made his escape.

In 55 B. C. Cæsar having subdued the Suevones, Bellovaci, Ambiani, Nervii, and other nations of Belgic Gaul, hastened to oppose the Usipetes and Tencteri. These nations having been driven out of their own country by the Suevi, had crossed the Rhine with a design to settle in Gaul. As soon as he appeared, the Germans sent him a deputation, offering to join him provided he would assign them lands. Cæsar replied, that there was no room in Gaul for them; but he would desire the Ubii to give them leave to settle among them. Upon this, they desired time to treat with the Ubii; but in the mean time fell upon some Roman squadrons: which so provoked Cæsar, that he immediately marched against them, and, coming unexpectedly upon them, defeated them with great slaughter. They fled in the utmost confusion; but the Romans pursued them to the conflux of the Rhine and the Mæse, where the slaughter was renewed with such fury, that almost 400,000 of the Germans perished. After this, Cæsar being resolved to spread the terror of the Roman name through Germany,

VOL. V.

built a bridge over the Rhine, and entered that country. In this expedition, however, which was his last in Germany, he performed no remarkable exploit. A little before his death, indeed, he had projected the conquest of that as well as of a great many other countries; but his assassination prevented the execution of his designs. Nor is there any thing recorded of the Germans till about 17 B. C. when the Tencteri made an irruption into Gaul, and defeated M. Lollius, proconsul of that province. At last, however, they were repulsed, and forced to retire with great loss beyond the Rhine.

Soon after this the Rheti invaded Italy, where they committed the greatest devastations, putting all the males they met to the sword, without distinction of sex or age: nay, we are told, that when they happened to take women with child, they consulted their augurs to know whether the child was a male or female; and if they pronounced it a male, the mother was immediately massacred. Against these barbarians was sent Drusus, the second son of Livia, a youth of extraordinary valour and great accomplishments. He found means to bring them to a battle; in which the Romans proved victorious, and cut in pieces great numbers of their enemies, with very little loss on their own side. Those who escaped the general slaughter, being joined by the Vindelici, took their route towards Gaul, with a design to invade that province. But Augustus, upon the first notice of their march, dispatched against them Tiberius with several chosen legions. He was no less successful than Drusus had been; for, having transported his troops over the lake Brigantium, now Constance, he fell unexpectedly on the enemy, gave them a total overthrow, took most of their strong-holds, and obliged the whole nation to submit to such terms as he chose to impose upon them. Thus were the Vindelici, the Rheti, and Norici, three of the most barbarous nations in Germany, subdued. Tiberius, to keep the conquered countries in awe, planted two colonies in Vindelicia, and opened from thence a road into Rætia and Noricum. One of the cities which he built for the defence of his colonies, he called, from his father Drusus, *Drusomagus*; the other by the name of Augustus, *Augusta Vindelicorum*; which cities are now known by the names of *Münzingen* and *Augsburg*. He next encountered the Pannonians, who had been subdued by Agrippa, but revolted on hearing the news of that great commander's death, which happened 11 years B. C. Tiberius, however, with the assistance of their neighbours the Scordisci, soon forced them to submit. They delivered up their arms, gave hostages, and put the Romans in possession of all their towns and strong-holds. Tiberius spared their lives; but laid waste their fields, plundered their cities, and sent the best part of their youth into other countries.

In the mean time, Drusus having prevented the Gauls from revolting, which they were ready to do, prepared to oppose the Germans who dwelt beyond the Rhine. They had collected the most numerous and formidable army that had ever been seen in those parts; with which they were advancing towards the Rhine, in order to invade Gaul. Drusus defeated them as they attempted to cross that river; and, pursuing the advantage he had gained, entered the country of the

Usipetes,

Germany.

2
Exploits of
Drusus in
Germany.

Ulpetes, now *Relinchusen*, and from thence advanced against the Sicambri, in the neighbourhood of the Lyppe and Ifel. Them he overthrew in a great battle, laid waste their country, burnt most of their cities, and, following the course of the Rhine, approached the German ocean, reducing the Frisii and the Chauci between the Ems and the Elbe. In these marches the troops suffered extremely for want of provisions; and Drusus himself was often in great danger of being drowned, as the Romans who attended him were at that time quite unacquainted with the flux and reflux of the ocean.

The Roman forces went into east Friesland for their winter-quarters; and next year (10 B. C.) Drusus marched against the Tencteri, whom he easily subdued. Afterwards, passing the Lypus, now the Lyppe, he reduced the Catti and Cherusci, extending his conquests to the banks of the Visurgis or Wefer: which he would have passed, had he not been in want of provisions, the enemy having laid waste the country to a considerable distance. As he was retiring, the Germans unexpectedly fell upon him in a narrow passage; and having surrounded the Roman army, cut a great many of them in pieces. But Drusus having animated his men by his example, after a bloody conflict, which lasted the whole day, the Germans were defeated with such slaughter, that the ground was strewed for several miles with dead bodies. Drusus found in their camp a great quantity of iron-chains which they had brought for the Romans; and so great was their confidence, that they had agreed before-hand about the division of the booty. The Tencteri were to have the horse, the Cherusci and Sicambri the baggage, and the Ulpetes and Catti the captives. After this victory, Drusus built two forts to keep the conquered countries in awe; the one at the confluence of the Lyppe and the Alme, the other in the country of the Catti on the Rhine. On this occasion also he made a famous canal, long after called in honour of him *Fossa Drusiana*, to convey the waters of the Rhine into the Sala or Sale. It extended eight miles; and was very convenient for conveying the Roman troops by water to the countries of the Frisii and Chauci, which was the design of the undertaking.

The following year, (9 B. C.), Augustus, bent on subduing the whole of Germany, advanced to the banks of the Rhine, attended by his two sons-in-law Tiberius and Drusus. The former he sent against the Daci, who lived on the south side of the Danube; and the latter to complete the conquests he had so successfully begun in the western parts of Germany. The former easily overcame the Daci, and transplanted 40,000 of them into Gaul. The latter, having passed the Rhine, subdued all the nations from that river to the Elbe; but having attempted in vain to cross this last, he set out for Rome: an end, however, was put to his conquests and his life by a violent fever, with which he was seized on his return.

After the death of Drusus, Tiberius again over-ran all those countries in which Drusus had spent the preceding summer; and struck some of the northern nations with such terror, that they sent deputies to sue for peace. This, however, they could not obtain upon any terms; the emperor declaring that he would not conclude a peace with one, unless they all desired

it. But the Catti, or according to some the Sicambri, could not by any means be prevailed upon to submit; so that the war was still carried on, though in a languid manner, for about 18 years. During this period, some of the German nations had quitted their forests, and begun to live in a civilized manner under the protection of the Romans; but one Quintilius Varus being sent to command the Roman forces in that country, so provoked the inhabitants by his extortions, that not only those who still held out refused to submit, but even the nations that had submitted were seized with an eager desire of throwing off the yoke. Among them was a young nobleman of extraordinary parts and valour, named *Arminius*. He was the son of Sigimer, one of the most powerful lords among the Catti, had served with great reputation in the Roman armies, and been honoured by Augustus with the privileges of a Roman citizen and the title of knight. But the love of his country prevailing over his gratitude, he resolved to improve the general discontent which reigned among his countrymen, to deliver them from the bondage of a foreign dominion. With this view he engaged, underhand, the leading men of all the nations between the Rhine and the Elbe, in a conspiracy against the Romans. In order to put Varus off his guard, he at the same time advised him to shew himself to the inhabitants of the more distant provinces, administer justice among them, and accustom them, by his example, to live after the Roman manner, which he said would more effectually subdue them than the Roman sword. As Varus was a man of a peaceable temper, and averse from military toils, he readily consented to this insidious proposal; and, leaving the neighbourhood of the Rhine, marched into the country of the Cherusci. Having there spent some time in hearing causes and deciding civil controversies, Arminius persuaded him to weaken his army, by sending out detachments to clear the country of robbers. When this was done, some distant nations of Germany rose up in arms by Arminius's directions; while those through which Varus was to pass in marching against them, pretended to be in a state of profound tranquillity, and ready to join the Romans against their enemies.

On the first news of the revolt, Varus marched against the enemy with three legions and six cohorts; but being attacked by the Germans as he passed through a wood, his army was almost totally cut off, while he himself and most of his officers fell by their own hands. Such a terrible overthrow, though it raised a general consternation in Rome, did not, however, dishearten Augustus, or cause him to abandon his enterprise. About two years after, (A. D. 12), Tiberius and Germanicus were appointed to command in Germany. The death of Augustus, however, which happened soon after, prevented Tiberius from going on his expedition; and Germanicus was for some time hindered from proceeding in his, by a revolt of the legions, first in Pannonia, and then in Germany. About the year 15, Germanicus having brought over the soldiers to their duty, laid a bridge across the Rhine, over which he marched 12,000 legionaries, 26 cohorts of the allies, and eight *ale* (squadrons of 300 each) of horse. With these he first traversed the Cæsan forest, (part of the Hercynian, and thought to lie part-

Germany.

10
Arminius
heads the
Germans
against the
Romans.

12
Cut off
Varus with
his army.

Germany. ly in the duchy of Cleves, and partly in Westphalia), and some other woods. On his march he was informed that the Marſi were celebrating a feſtival with great mirth and jollity. Upon this he advanced with ſuch expedition, that he ſurprized them in the midſt of their debauch; and giving his army full liberty to make what havock they pleaſed, a terrible maſſacre enſued, and the country was deſtroyed with fire and ſword for 50 miles round, without the loſs of a ſingle man on the part of the Romans.—This general maſſacre roused the Bruſteri, the Tubantes, and the Uſipetes; who, beſetting the paſſes through which the Roman army was to return, fell upon their rear, and put them into ſome diſorder; but the Romans ſoon recovered themſelves, and defeated the Germans with conſiderable loſs.

12
Exploits of
Germanicus.

The following year, (A. D. 16), Germanicus taking advantage of ſome intestine broils which happened among the Catti, entered their country, where he put great numbers to the ſword. Moſt of their youth, however, eſcaped by ſwimming over the Adrana, now the *Eder*, and attempted to prevent the Romans from laying a bridge over that river: but being diſappointed in this, ſome of them ſubmitted to Germanicus, while the greater part, abandoning their villages, took refuge in the woods; ſo that the Romans, without oppoſition, ſet fire to all their villages, towns, &c. and having laid their capital in aſhes, began their march back to the Rhine.

Germanicus had ſcarce reached his camp, when he received a meſſage from Segeltes, a German prince, in the intereſt of the Romans, acquainting him that he was beſieged in his camp by Arminius. On this advice, he inſtantly marched againſt the beſiegers; entirely defeated them; and took a great number of priſoners, among whom was Thuneldis, the wife of Arminius, and daughter of Segeltes, whom the former had carried off, and married againſt her father's will. Arminius then, more enraged than ever, for the loſs of his wife, whom he tenderly loved, ſtirred up all the neighbouring nations againſt the Romans. Germanicus, however, without being diſmayed by ſuch a formidable confederacy, prepared himſelf to oppoſe the enemy with vigour: but, that he might not be obliged to engage ſuch numerous forces at once, he detached his Lieutenant Cæcina, at the head of 40 cohorts, into the territories of the Bruſteri; while his cavalry, under the command of Pedo, entered the country of the Friſi. As for Germanicus himſelf, he embarked the remainder of his army, conſiſting of four legions, on a neighbouring lake; and tranſported them by rivers and canals to the place appointed on the river Ems, where the three bodies met. In their march they found the ſaid remains of the legions conducted by Varus, which they buried with all the ceremony their circumſtances could admit. After this they advanced againſt Arminius, who retired and poſted himſelf advantageouſly cloſe to a wood. The Roman general followed him; and coming up with him, ordered his cavalry to advance and attack the enemy. Arminius, at their firſt approach, pretended to fly; but ſuddenly wheeled about, and giving the ſignal to a body of troops, whom he had concealed in the wood, to riſh out, obliged the cavalry to give ground. The cohorts then advanced to their relief; but they too were

put into diſorder, and would have been puſhed into a moras, had not Germanicus himſelf advanced with the reſt of the cavalry to their relief. Arminius did not think it prudent to engage theſe freſh troops, but retired in good order; upon which Germanicus alſo retired towards the Ems. Here he embarked with four legions, ordered Cæcina to reconduct the other four by land, and ſent the cavalry to the ſea-ſide, with orders to march along the ſhore to the Rhine. Though Cæcina was to return by roads well known, yet Germanicus adviſed him to paſs, with all poſſible ſpeed, a cauſeway, called the *long bridge*, which led acroſs waſt marſhes, ſurrounded on all ſides with woods and hills that gently roſe from the plain.

Arminius, however, having got notice of Cæcina's march, arrived at the long bridges before Cæcina, and filled the woods with his men, who, on the approach of the Romans, ruſhed out, and attacked them with great fury. The legions, not able to manage their arms in the deep waters and ſlippery ground, were obliged to yield; and would in all probability have been entirely defeated, had not night put an end to the combat. The Germans, encouraged by their ſucceſs, inſtead of reſreſhing themſelves with ſleep, ſpent the whole night in diverting the courſes of the ſprings which roſe in the neighbouring mountains; ſo that, before day, the camp which the Romans had begun was laid under water, and their works were overturned. Cæcina was for ſome time at a loſs what to do; but at laſt reſolved to attack the enemy by day-break, and, having driven them to their woods, to keep them there in a manner beſieged, till the baggage and wounded men ſhould paſs the cauſeway, and get out of the enemy's reach. But when his army was drawn up, the legions poſted on the wings, ſeized with a ſudden panic, deſerted their ſtations, and occupied a field beyond the marſhes. Cæcina thought it adviſable to follow them; but the baggage ſtuck in the mire, as he attempted to croſs the marſhes, which greatly embarraſſed the ſoldiers. Arminius perceiving this, laid hold of the opportunity to begin the attack; and crying out, "This is a ſecond Varus, the ſame fate attends him and his legions," fell on the Romans with inexpreſſible fury. As he had ordered his men to aim chiefly at the horſes, great numbers of them were killed; and the ground becoming ſlippery with their blood and the ſlime of the marſh, the reſt either fell or threw their riders, and, galloping through the ranks, put them in diſorder. Cæcina diſtinguiſhed himſelf in a very eminent manner; but his horſe being killed, he would have been taken priſoner, had not the firſt legion reſcued him. The greedineſs of the enemy, however, ſaved the Romans from utter deſtruction; for juſt as the legions were quite ſpent, and on the point of yielding, the barbarians on a ſudden abandoned them in order to ſeize their baggage. During this reſpite, the Romans ſtruggled out of the marſh, and having gained the dry fields, formed a camp with all poſſible ſpeed, and fortified it in the beſt manner they could.

The Germans having loſt the opportunity of deſtroying the Romans, contrary to the advice of Arminius, attacked their camp next morning, but were repulſed with great ſlaughter; after which they gave Cæcina no more moleſtation till he reached the banks of the Rhine. Germanicus, in the mean time, having

Germany.

Germany. conveyed the legions he had with him down the river Ems into the ocean, in order to return by sea to the river Rhine, and finding that his vessels were overloaded, delivered the second and fourteenth legions to Publius Vitellius, desiring him to conduct them by land. But this march proved fatal to great numbers of them; who were either buried in the quicksands, or swallowed up by the overflowing of the tide, to which they were as yet utter strangers. Those who escaped, lost their arms, utensils, and provisions; and passed a melancholy night upon an eminence, which they had gained by wading up to the chin. The next morning the land returned with the tide of ebb; when Vitellius, by a hasty march, reached the river Ufingis, by some thought to be the Hoerensfer, on which the city of Groningen stands. There Germanicus, who had reached that river with his fleet, took the legions again on board, and conveyed them to the mouth of the Rhine, whence they all returned to Cologne, at a time when it was reported they were totally lost.

This expedition, however, cost the Romans very dear, and procured very few advantages. Great numbers of men had perished; and by far the greatest part of those who had escaped so many dangers returned without arms, utensils, horses, &c. half naked, lamed, and unfit for service. The next year, however, Germanicus, bent on the entire reduction of Germany, made vast preparations for another expedition. Having considered the various accidents that had befallen him during the war, he found that the Germans were chiefly indebted for their safety to their woods and marshes, their short summers and long winters; and that his troops suffered more from their long and tedious marches than from the enemy. For this reason he resolved to enter the country by sea, hoping by that means to begin the campaign earlier, and surprise the enemy. Having, therefore, built with great dispatch, during the winter, 1000 vessels of different sorts, he ordered them early in the spring (A. D. 16) to fall down the Rhine, and appointed the island of the Batavians for the general rendezvous of his forces. When the fleet was sailing, he detached Silius one of his lieutenants, with orders to make a sudden irruption into the country of the Catti; and, in the meantime, he himself, upon receiving intelligence that a Roman fort on the Luppias was besieged, hastened with six legions to its relief. Silius was prevented, by sudden rains, from doing more than taking some small booty, with the wife and daughter of Arpen king of the Catti; neither did those who besieged the fort wait the arrival of Germanicus. In the mean time, the fleet, arriving at the island of the Batavians, the provisions and warlike engines were put on board and sent forward; ships were assigned to the legions and allies; and the whole army being embarked, the fleet entered the canal formerly cut by Drusus, and from his name called *Fossa Drusiana*. Hence he sailed prosperously to the mouth of the Ems; where, having landed his troops, he marched directly to the Weser, where he found Arminius encamped on the opposite bank, and determined to dispute his passage. The next day Arminius drew out his troops in order of battle: but Germanicus, not thinking it advisable to attack them, ordered the horse to ford over under the command of his lieutenants Stertinius and Emilus;

who, to divide the enemy's forces, crossed the river in two different places. At the same time Cariovalda, the leader of the Batavian auxiliaries, crossed the river where it was most rapid: but, being drawn into an ambuscade, he was killed, together with most of the Batavian nobility; and the rest would have been totally cut off, had not Stertinius and Emilus hastened to their assistance. Germanicus in the mean time passed the river without molestation. A battle soon after ensued; in which the Germans were defeated with so great a slaughter that the ground was covered with arms and dead bodies for more than ten miles round; and among the spoils taken on this occasion, were found, as formerly, the chains with which the Germans had hoped to bind their captives.

In memory of this signal victory Germanicus raised a mount, upon which he placed as trophies the arms of the enemy, and inscribed underneath the names of the conquered nations. This so provoked the Germans, though already vanquished and determined to abandon their country, that they attacked the Roman army unexpectedly on its march, and put them into some disorder. Being repulsed, they encamped between a river and a large forest surrounded by a marsh except on one side, where it was inclosed by a broad rampart formerly raised by the Angrivarii as a barrier between them and the Cherusci. Here another battle ensued; in which the Germans behaved with great bravery, but in the end were defeated with great slaughter.

After this second defeat, the Angrivarii submitted, and were taken under the protection of the Romans, and Germanicus put an end to the campaign. Some of the legions he sent to their winter-quarters by land, while he himself embarked with the rest on the river Ems, in order to return by sea. The ocean proved at first very calm, and the wind favourable: but all of a sudden a storm arising, the fleet, consisting of 1000 vessels, was dispersed: some of them were swallowed up by the waves; others were dashed in pieces against the rocks, or driven upon remote and inhospitable islands, where the men either perished by famine, or lived upon the flesh of the dead horses with which the shores soon appeared strewed; for, in order to lighten their vessels, and disengage them from the shoals, they had been obliged to throw overboard their horses and beasts of burden, nay, even their arms and baggage. Most of the men, however, were saved, and even great part of the fleet recovered. Some of them were driven upon the coast of Britain; but the petty kings who reigned there, generously sent them back.

On the news of this misfortune, the Catti, taking new courage, ran to arms; but Caius Silius being detached against them with 30,000 foot and 3000 horse, kept them in awe. Germanicus himself, at the head of a numerous body, made a sudden irruption into the territories of the Marfi, where he recovered one of Varus's eagles, and having laid waste the country, he returned to the frontiers of Germany, and put his troops into winter-quarters; whence he was soon recalled by Tiberius, and never suffered to return into Germany again.

After the departure of Germanicus, the more northern nations of Germany were no more molested by the Romans. Arminius carried on a long and successful war with Maroboduus king of the Marcomanni,

Germany.

13
His second
expedition.

14
His fleet
dispersed by
a storm.

Germany.

manni, whom he at last expelled, and forced to apply to the Romans for assistance; but, excepting Germanicus, it seems they had at this time no other general capable of opposing Arminius, so that Maroboduus was never restored. After the final departure of the Romans, however, Arminius having attempted to enslave his country, by the treachery of his own kindred. The Germans held his memory in great veneration; and Tacitus informs us, that in his time they still celebrated him in their songs.

Nothing remarkable occurs in the history of Germany from this time till the reign of the emperor Claudius. A war indeed is said to have been carried on by Lucius Domitius, father to the emperor Nero. But of his exploits we know nothing more than that he penetrated beyond the river Elbe, and led his army farther into the country than any of the Romans had ever done. In the reign of Claudius, however, the German territories were invaded by Cn. Domitius Corbulo, one of the greatest generals of his age. But when he was on the point of forcing them to submit to the Roman yoke, he was recalled by Claudius, who was jealous of the reputation he had acquired.

In the reign of Vespasian, a terrible revolt happened among the Batavians and those German nations who had submitted to the Romans, a particular account of which is given under the article Rome. The revolters were with difficulty subdued; but, in the reign of Domitian, the Dacians invaded the empire, and proved a more terrible enemy than any of the other German nations had been. After several defeats, the emperor was at last obliged to consent to pay an annual tribute to Decebalus king of the Dacians; which continued to the time of Trajan. But this warlike prince refused to pay tribute; alleging, when it was demanded of him, that "he had never been conquered by Decebalus." Upon this the Dacians passed the Danube, and began to commit hostilities in the Roman territories. Trajan, glad of this opportunity to humble an enemy whom he began to fear, drew together a mighty army, and marched with the utmost expedition to the banks of the Danube. As Decebalus was not apprised of his arrival, the emperor passed the river without opposition, and entering Dacia, laid waste the country with fire and sword. At last he was met by Decebalus with a numerous army. A bloody engagement ensued, in which the Dacians were defeated; tho' the victory cost the Romans dear: the wounded were so numerous, that they wanted linen to bind up their wounds; and to supply the defect, the emperor generously devoted his own wardrobe. After the victory, he pursued Decebalus from place to place, and at last obliged him to consent to a peace on the following terms. 1. That he should surrender the territories which he had unjustly taken from the neighbouring nations. 2. That he should deliver up his arms, his warlike engines, with the artificers who made them, and all the Roman deserters. 3. That, for the future, he should entertain no deserters, nor take into his service the natives of any country subject to Rome. 4. That he should dismantle all his fortresses, castles, and strong-holds; and lastly, that he should have the same friends and foes with the people of Rome.

With these hard terms Decebalus was obliged to

comply, though fore against his will; and being introduced to Trajan, threw himself on the ground before him, acknowledging himself his vassal: after which the latter, having commanded him to send deputies to the senate for the ratification of the peace, returned to Rome.

This peace was of no long duration. Four years after, (A.D. 105), Decebalus, unable to live in servitude as he called it, began, contrary to the late treaty, to raise men, provide arms, entertain deserters, fortify his castles, and invite the neighbouring nations to join him against the Romans as a common enemy. The Scythians hearkened to his solicitations; but the Jazyges, a neighbouring nation, refusing to bear arms against Rome, Decebalus invaded their country. Hereupon Trajan marched against him; but the Dacian, finding himself unable to withstand him by open force, had recourse to treachery, and attempted to get the emperor murdered. His design, however, proved abortive, and Trajan pursued his march into Dacia. That his troops might the more readily pass and repass the Danube, he built a bridge over that river; which by the ancients is styled the most magnificent and wonderful of all his works*. To guard the bridge, he ordered two castles to be built; one on this side the Danube, and the other on the opposite side; and all this was accomplished in the space of one summer. Trajan, however, as the season was now far advanced, did not think it advisable to enter Dacia this year, but contented himself with making the necessary preparations.

In the year 106, early in the spring, Trajan set out for Dacia; and having passed the Danube on the bridge he had built, reduced the whole country, and would have taken Decebalus himself had he not put an end to his own life, in order to avoid falling into the hands of his enemies. After his death the kingdom of Dacia was reduced to a Roman province; and several castles were built in it, and garrisons placed in them, to keep the country in awe.

After the death of Trajan, the Roman empire began to decline, and the northern nations to be daily more and more formidable. The province of Dacia indeed was held by the Romans till the reign of Gallienus; but Adrian, who succeeded Trajan, caused the arches of the bridge over the Danube to be broken down, lest the barbarians should make themselves masters of it, and invade the Roman territories. In the time of Marcus Aurelius, the Marcomanni and Quadi invaded the empire, and gave the emperor a terrible overthrow. He continued the war, however, with better success afterwards, and invaded their country in his turn. It was during the course of this war that the Roman army is said to have been saved from destruction by that miraculous event related under the article CHRISTIANS, in Vol. III. p. 1935. par. ult.

In the end, the Marcomanni and Quadi were, by repeated defeats, brought to the verge of destruction; insomuch that their country would probably have been reduced to a Roman province, had not Marcus Aurelius been diverted from pursuing his conquests by the revolt of one of his generals. After the death of Marcus Aurelius, the Germanic nations became every day more and more formidable to the Romans. Far from being able to invade and attempt the conquest of

Germany.

* See Architecture, no 138.

18 Marcomanni and Quadi formidable to the empire.

15 Death of Arminius.

16 The Dacians invade the Roman empire.

17 They are subdued by Trajan.

Germany. these northern countries, the Romans had the greatest difficulty to repress the incursions of their inhabitants. But for a particular account of their various invasions of the Roman empire, and its total destruction by them at last, see the article *ROME*.

19 Roman em-
pire de-
stroyed by
the Heruli.
The immediate destroyers of the Roman empire were the Heruli; who, under their leader Odoacer, de-throned Augustulus the last Roman emperor, and proclaimed Odoacer king of Italy. The Heruli were soon expelled by the Ostrogoths; and these in their turn were subdued by Justinian, who re-annexed Italy to the eastern empire. But the Popes found means to obtain the temporal as well as spiritual jurisdiction over a considerable part of the country, while the Lombards subdued the rest. These last proved very troublesome to the Popes, and at length besieged Adrian I. in his capital. In this distress he applied to Charles the Great, king of France; who conquered both Italy and Germany, and was crowned emperor of the west in 800. See *FRANCE*, n° 24, &c.

20
History of
Germany
since the
time of
Charle-
magne.

The posterity of Charlemagne inherited the empire of Germany until the year 880; at which time the different princes assumed their original independence, rejected the Carolinian line, and placed Arnulph king of Bohemia on the throne. Since this time, Germany has ever been considered as an elective monarchy. Princes of different families, according to the prevalence of their interest and arms, have mounted the throne. Of these the most considerable, until the Austrian line acquired the imperial power, were the houses of Saxony, Franconia, and Swabia. The reigns of these emperors contain nothing more remarkable than the contests between them and the popes; for an account of which, see the article *ITALY*. From hence, in the beginning of the 13th century, arose the factions of the Guelphs and Gibelines, of which the former was attached to the popes, and the latter to the emperor; and both, by their virulence and inveteracy, tended to disquiet the empire for several ages. The emperors too were often at war with the Infidels; and sometimes, as happens in all elective kingdoms, with one another, about the succession.

But what more deserves our attention is the progress of government in Germany, which was in some measure opposite to that of the other kingdoms of Europe. When the empire, raised by Charlemagne, fell asunder, all the different independent princes assumed the right of election; and those now distinguished by the name of *electors* had no peculiar or legal influence in appointing a successor to the imperial throne; they were only the officers of the king's household, his secretary, his steward, chaplain, marshal, or master of his horse, &c. By degrees, however, as they lived near the king's person, and had, like all other princes, independent territories belonging to them, they increased their influence and authority; and in the reign of Otto III. 984, acquired the sole right of electing the emperor. Thus, while in the other kingdoms of Europe, the dignity of the great lords, who were all originally allodial or independent barons, was diminished by the power of the king, as in France, and by the influence of the people, as in Great Britain; in Germany, on the other hand, the power of the electors was raised upon the ruins of the emperor's supremacy, and of the people's jurisdiction. In 1440, Fre-

deric III. duke of Austria, was elected emperor, and the imperial dignity continued in the male line of that family for 300 years. His successor Maximilian married the heiress of Charles duke of Burgundy; where-by Burgundy, and the 17 provinces of the Netherlands, were annexed to the house of Austria. Charles V. grandson of Maximilian, and heir to the kingdom of Spain, was elected emperor in the year 1519. Under him Mexico and Peru were conquered by the Spaniards; and in his reign happened the REFORMATION in several parts of Germany, which, however, was not confirmed by public authority till the year 1648, by the treaty of Westphalia, and in the reign of Ferdinand III. The reign of Charles V. was continually disturbed by his wars with the German princes and the French king Francis I. Though successful in the beginning of his reign, his good fortune, towards the conclusion of it, began to forsake him; which, with other reasons, occasioned his abdication of the crown.

* See
Charles V.

His brother Ferdinand I. who in 1558 succeeded to the throne, proved a moderate prince with regard to religion. He had the address to get his son Maximilian declared king of the Romans in his own lifetime, and died in 1564. By his last will he ordered, that if either his own male issue, or that of his brother Charles, should fail, his Austrian estates should revert to his second daughter Anne, wife to the elector of Bavaria, and her issue. We mention this destination, as it gave rise to the late opposition made by the house of Bavaria to the pragmatic sanction, in favour of the empress queen of Hungary, on the death of her father Charles VI. The reign of Maximilian II. was disturbed with internal commotions, and an invasion from the Turks; but he died in peace, in 1576. He was succeeded by his son Rodolph; who was involved in wars with the Hungarians, and in differences with his brother Matthias, to whom he ceded Hungary and Austria in his lifetime. He was succeeded in the empire by Matthias; under whom the reformers, who went under the names of *Lutherans* and *Calvinists*, were so much divided among themselves, as to threaten the empire with a civil war. The ambition of Matthias at last tended to reconcile them; but the Bohemians revolted, and threw the imperial commissaries out of a window at Prague. This gave rise to a ruinous war, which lasted 30 years. Matthias thought to have exterminated both parties; but they formed a confederacy, called the *Evangelic League*, which was counterbalanced by a Catholic league.

Matthias dying in 1618, was succeeded by his cousin Ferdinand II.; but the Bohemians offered their crown to Frederic the elector Palatine, the most powerful Protestant prince in Germany, and son-in-law to his Britannic majesty James I. That prince was incautious enough to accept of the crown; but he lost it, by being entirely defeated by the duke of Bavaria and the imperial generals at the battle of Prague; and he was even deprived of his electorate, the best part of which was given to the duke of Bavaria. The Protestant princes of Germany, however, had among them at this time many able commanders, who were at the head of armies, and continued the war with wonderful obstinacy: among them were the margrave of Baden Durlach, Christian duke of Brunswick, and count Mansfield; the last was one of the best generals of the age.

Germany. age. Christiern IV. king of Denmark declared for them; and Richlieu, the French minister, was not fond of seeing the house of Austria aggrandized. The emperor, on the other hand, had excellent generals; and Christiern, having put himself at the head of the evangelic league, was defeated by Tilly, an imperialist of great reputation in war. Ferdinand made so moderate a use of his advantages obtained over the Protestants, that they formed a fresh confederacy at Leipzig, of which the celebrated Gustavus Adolphus king of Sweden was the head. An account of his glorious victories is given under the article SWEDEN. At last he was killed at the battle of Lutzen, in 1632. But the Protestant cause did not die with him. He had brought up a set of heroes, such as the duke of Saxe Weimar, Torstenson, Banier, and others, who shook the Austrian power; till, under the mediation of Sweden, a general peace was concluded among all the belligerent powers, at Munster, in the year 1648; which forms the basis of the present political system of Europe.

Ferdinand II. was succeeded by his son Ferdinand III. This prince died in 1657; and was succeeded the emperor Leopold, a severe, unamiable, and not very fortunate prince. He had two great powers to contend with, France on the one side, and the Turks on the other; and was a loser in his war with both. France took from him Alsace, and many other frontier places of the empire; and the Turks would have taken Vienna, had not the siege been raised by John Sobieski king of Poland. Prince Eugene of Savoy was a young adventurer in arms about the year 1697; and being one of the imperial generals, gave the Turks the first checks they received in Hungary. The empire, however, could not have withstood the power of France; who pursued her conquests with such rapidity, that the other parts of Europe were alarmed, and a great confederacy, consisting of the Empire, Great Britain, the Dutch under William Prince of Orange, and the northern powers, was formed to check the progress of the French, and render abortive the ambitious plan contrived by Lewis XIV. for founding an universal monarchy. At last, however, a peace was concluded at Ryfwick, in 1697; and two years after, the Turks consented to a peace, which was signed at Carlowitz in 1699. The Hungarians, secretly encouraged by the French, and exasperated by the unfeeling tyranny of Leopold, were still in arms, under the protection of the Porte, when that prince died in 1705.

He was succeeded by his son Joseph, who put the electors of Cologne and Bavaria to the ban of the empire; but being ill served by prince Lewis of Baden, general of the empire, the French partly recovered their affairs, notwithstanding their repeated defeats. The duke of Marlborough had not all the success he expected or deserved. Joseph himself was suspected of a design to subvert the Germanic liberties; and it was plain by his conduct, that he expected England should take the labouring oar in the war, which was to be entirely carried on for his benefit. The English were disgusted at his slowness and selfishness; but he died in 1711, before he had reduced the Hungarians; and leaving no male issue, he was succeeded in the empire by his brother Charles VI. whom the allies

Germany. were endeavouring to place on the throne of Spain, in opposition to Philip, duke of Anjou, grandson to Lewis XIV.

When the peace of Utrecht took place in 1713, Charles at first made a shew as if he would continue the war; but found himself unable, now that he was forsaken by the English. He therefore was obliged to conclude a peace with France at Baden in 1714, that he might attend the progress of the Turks in Hungary; where they received a total defeat from prince Eugene, at the battle of Peterwaradin. They received another of equal importance from the same general in 1717, before Belgrade, which fell into the hands of the imperialists; and next year the peace of Passarowitz, between them and the Turks, was concluded. Charles employed every minute of his leisure in making arrangements for increasing and preserving his hereditary dominions in Italy and the Mediterranean. Happily for him, the crown of Britain devolved to the house of Hanover; an event which gave him a very decisive weight in Europe, by the connections between George I. and II. and the empire. Charles was sensible of this; and carried matters with so high a hand, that, about the years 1724 and 1725, a breach ensued between him and George I. and so uneasy was the system of affairs all over Europe at that time, that the capital powers often changed their old alliances, and concluded new ones contradictory to their interest. Without entering into particulars, it is sufficient to observe, that the safety of Hanover, and its aggrandizement, was the main object of the British court; as that of the emperor was the establishment of the pragmatic sanction, in favour of his daughter, the present empress-queen, he having no male issue. Mutual concessions upon those great points restored a good understanding between George II. and the emperor Charles; and the elector of Saxony, flattered with the view of gaining the throne of Poland, relinquished the great claims he had upon the Austrian succession.

The emperor, after this, had very bad success in a war he entered into with the Turks, which he had undertaken chiefly to indemnify himself for the great sacrifices he had made in Italy to the princes of the house of Bourbon. Prince Eugene was then dead, and he had no general to supply his place. The system of France, however, under cardinal Fleury, happened at that time to be pacific; and she obtained for him, from the Turks, a better peace than he had reason to expect. Charles, to keep the German and other powers easy, had, before his death, given his eldest daughter, the present empress queen, in marriage to the duke of Lorraine, a prince who could bring no accession of power to the Austrian family.

Charles died in 1740; and was no sooner in the grave, than all he had so long laboured for must have been overthrown, had it not been for the firmness of George II. The young king of Prussia entered and conquered Silesia, which he said had been wrongfully dimembered from his family. The king of Spain and the elector of Bavaria set up claims directly incompatible with the pragmatic sanction, and in this they were joined by France; though all those powers had solemnly guaranteed it. The imperial throne, after a considerable vacancy, was filled up by the elector of Bavaria, who took the title of Charles VII. in January

Germany. 1742. The French poured their armies into Bohemia, where they took Prague; and the queen of Hungary, to take off the weight of Prussia, was forced to cede to that prince the most valuable part of the duchy of Silesia by a formal treaty.

Her youth, her beauty, and sufferings, and the noble fortitude with which she bore them, touched the hearts of the Hungarians, into whose arms she threw herself and her little son; and though they had been always remarkable for their disaffection to the house of Austria, they declared unanimously in her favour. Her generals drove the French out of Bohemia; and George II. at the head of an English and Hanoverian army, gained the battle of Dettingen, in 1743. Charles VII. was at this time miserable on the imperial throne, and would have given the queen of Hungary almost her own terms; but she haughtily and impolitically rejected all accommodation, though advised to it by his Britannic majesty, her best and indeed only friend. This obstinacy gave a colour for the king of Prussia to invade Bohemia, under pretence of supporting the imperial dignity: but though he took Prague, and subdued the greatest part of the kingdom, he was not supported by the French; upon which he abandoned all his conquests, and retired into Silesia. This event confirmed the obstinacy of the queen of Hungary; who came to an accommodation with the emperor, that he might recover Silesia. Soon after, his imperial majesty, in the beginning of the year 1745, died; and the duke of Lorraine, then grand duke of Tuscany, consort to the queen of Hungary, after surmounting some difficulties, was chosen emperor.

The bad success of the allies against the French and Bavarians in the Low Countries, and the loss of the battle of Fontenoy, retarded the operations of the empress-queen against his Prussian majesty. The latter beat the emperor's brother, prince Charles of Lorraine, who had before driven the Prussians out of Bohemia: and the conduct of the empress-queen was such, that his Britannic majesty thought proper to guarantee to him the possession of Silesia, as ceded by treaty. Soon after, his Prussian majesty pretended that he had discovered a secret convention which had been entered into between the empress-queen, the empress of Russia, and the king of Poland as elector of Saxony, to strip him of his dominions, and to divide them among themselves. Upon this his Prussian majesty, very suddenly, drove the king of Poland out of Saxony, defeated his troops, and took possession of Dresden; which he held till a treaty was made under the mediation of his Britannic majesty, by which the king of Prussia acknowledged the duke of Lorraine, great duke of Tuscany, for emperor. The war, however, continued in the Low Countries, not only to the disadvantage, but to the discredit, of the Austrians and Dutch, till it was finished by the treaty of Aix-la-Chapelle, in April 1748. By that treaty Silesia was once more guaranteed to the king of Prussia. It was not long before that monarch's jealousies were renewed and verified; and the empress of Russia's views falling in with those of the empress-queen and the king of Poland, who were unnaturally supported by France in their new schemes, a fresh war was kindled in the empire. The king of Prussia declared

against the admission of the Russians into Germany, and his Britannic majesty against that of the French. Upon those two principles all former differences between these monarchs were forgotten, and the British parliament agreed to pay an annual subsidy of 670,000*l.* to his Prussian majesty during the continuance of the war.

The flames of war now broke out in Germany with greater fury and more destructive violence than ever. The armies of his Prussian majesty, like an irresistible torrent, burst in Saxony; totally defeated the imperial general Brown at the battle of Lowositz; forced the Saxons to lay down their arms, though almost impregnable fortified at Pirna; and the elector of Saxony fled to his regal dominions in Poland. After this, his Prussian majesty was put to the ban of the empire; and the French poured, by one quarter, their armies, as the Russians did by another, into the empire. The conduct of his Prussian majesty on this occasion is the most amazing that is to be met with in history; for a particular account of which, see the article PRUSSIA.

At last, however, the taking of Colberg by the Russians, and of Schweidnitz by the Austrians, was on the point of completing his ruin, when his most formidable enemy, the empress of Russia, died, January 5. 1762; George II. his only ally, had died on the 25th of October, 1760.

The deaths of those illustrious personages were followed by great consequences. The British ministry of George III. sought to finish the war with honour, and the new emperor of Russia recalled his armies. His Prussian majesty was, notwithstanding, so very much reduced by his losses, that the empress-queen, probably, would have completed his destruction, had it not been for the wise backwardness of other German princes, not to annihilate the house of Brandenburg. At first the empress-queen rejected all terms proposed to her, and ordered 30,000 men to be added to her armies. The visible backwardness of her generals to execute her orders, and new successes obtained by his Prussian majesty, at last prevailed on her to agree to an armistice, which was soon followed by the treaty of Hubertsburg, which secured to his Prussian majesty the possession of Silesia. Upon the death of the emperor, her husband, in 1765, her son Joseph, who had been crowned king of the Romans in 1764, succeeded him in the empire.

At present, Germany is bounded on the north by the Baltic Sea, Denmark, and the German Ocean; on the east by Prussia, Hungary, and Poland; and on the west by the Low Countries, Lorraine, and Franche Comté: so that it now comprehends the Palatinates of Cologne, Triers, and Liege, which formerly belonged to the Gauls; and is dismembered of Friesland, Groningen, and Overysel, which are now incorporated with the Low Countries.

Since the time of Charles the Great, this country Situation, has been divided into High and Low Germany. The extent, &c. first comprehends the Palatinate of the Rhine, Fran- of Germa- conia, Suabia, Bavaria, Bohemia, Moravia, Austria, ny. Carinthia, Carniola, Stiria, the Swiss, and the Grisons. The provinces of Low Germany are, the Low Country of the Rhine, Triers, Cologne, Mentz, Westphalia, Hesse, Brunswick, Misnia, Lusatia, High Saxony upon the Elbe, Low Saxony upon the Elbe, Mecklenburg, Lu-

Germany.

Lunenbourg, Brandenburg, and Pomerania. For a particular description of all these, see the articles as they occur in the order of the alphabet.

22
Constitu-
tion of the
empire.

The empire, as we have already observed, is elective; and the laws require no other qualifications in a candidate, but that he be *justus, bonus, et utilis*, without any limitation in regard to religion, nation, state, or age. But as the Popish electors are more in number than the Protestant, a Roman-catholic prince is always chosen. The election is at Frankfort on the Maine, within three months after the former emperor's death. The electors appear either in person or by their envoys; and if an elector absent himself, the election, notwithstanding, is valid. Before the day of election, all foreigners are ordered to depart the town. Whoever has more than half the voices of the college for him, is elected; and an elector may even give his vote for himself. When the election is over, the person elected, or his plenipotentiary, must immediately subscribe and swear to the capitulation of election: but if the person elected is not present in person, he must swear to it himself before he is crowned, and before he can take upon him the government; which, till then, belongs to the vicars of the empire. His coronation, for which he appoints a day himself, is always performed in the place where he was elected; though both election and coronation ought to be in the city of Aix-la-Chapelle. He then takes a general oath of a ruler, and, among other things, promises all due veneration to the Pope and church. The emperors used formerly to be crowned by the Popes, till the reign of Charles V. but from that time the papal coronation has been dispensed with. However, immediately upon his entering upon the government, he testifies his veneration for the Pope by an embassy. The title of the emperor runs thus: "N. by the grace of God, elected Roman emperor (*imperator*), at all times augmentor of the empire (*semper Augustus*), in or of Germany king." Then follow the titles of the hereditary imperial dominions. The states of the empire give the emperor the title of "Most illustrious, most powerful, and most invincible Roman emperor;" the last of which is omitted by the electors. The emperor is looked upon by all other crowned heads and states in Europe as the first European potentate, and as such precedence is given him and his ambassadors. He is the supreme head of the German empire; but his power in the administration thereof is very limited. With respect to ecclesiastical matters, his prerogative consists principally in the right of the first petition (*jus primarii arum precum*); by virtue of which, in all foundations and cloisters of the empire, he may, once during his administration, confer a benefice on any person qualified for it by the statutes; and in that of a panis brief to each foundation or cloister in the empire, by virtue of which, such foundation is obliged to admit into it the person who has obtained the emperor's brief, and there provide him, during life, with meat, drink, cloaths, and other necessities. With respect to temporal matters, he can create princes, dukes, marquises, counts, barons, knights, &c. raise countries and territories to a higher rank; bestow arms, and grant letters of respite and protection, securing a debtor against his creditor; establish universities, fairs, and markets; empower any

Germany.

person to adopt another, and to assume a title from his estate; erect any place into a sanctuary; confer majority on minors; legitimate children born out of wedlock; confirm the contracts and stipulations of the empire; remit oaths extorted from them; invest such as possess fiefs of the empire, and decide in feudal matters relative thereto, &c. but he cannot grant to any person privileges detrimental to the rights of the immediate sovereign of that person. He can also grant exclusive privileges for printing particular books, and for new-invented machines, &c. He appoints most of the officers, civil and military, of the empire, except such as are hereditary; as the great chancellor, treasurer, &c. but these are only honorary. In ancient times the emperor had considerable domains and incomes in the empire; but almost all these have been successively mortgaged and alienated, so that at present the certain revenues of the emperor are very inconsiderable: but then, as he has the disposal of most offices, the creation of princes and noblemen, is entitled to all confiscations and forfeitures, and invests the several princes in their estates, besides those that hold fiefs of the empire in Italy, the profit of these articles may amount to a large sum. He has also some offerings from the Jews, and the free gifts of the order of knights of the empire. A successor in the empire is frequently chosen by the electors during the life of the emperor, who is styled *king of the Romans*. He is elected and crowned in the same manner as the emperor; has the title of *majesty*; takes precedence of all other kings in Christendom; and succeeds of course at the emperor's death.

The arms of the empire are a black eagle with two heads, hovering with expanded wings in a field of gold; and over the heads of the eagle is seen the imperial crown. 24
Arms of the
empire.

The diet of the empire consists of the emperor, the nine electors, the ecclesiastical and secular princes, and the deputies of imperial cities. The electors are divided into spiritual and temporal. The spiritual electors are, the archbishops of Mentz, Triers, and Cologne; and the secular, those of Bohemia, Palatine, Brandenburg, Saxony, Bavaria, and Hanover. The spiritual electors are such of course as soon as they are chosen to their sees by their respective chapters. In the reign of Henry IV. the right of election is said to have been introduced. Till the peace of Westphalia there were only seven electors, when an eighth was added; and, in 1692, a ninth, in favour of the illustrious house of Brunswick Lunenburg, now in possession of a much higher and infinitely more valuable dignity, viz. the crown of Great Britain. The spiritual are styled by the emperor, *highly worthy nephews*; the temporal, *most illustrious uncles*. By the other members of the empire, the spiritual, who were not born princes, are styled, *your electoral grace*; but such as were, and also the temporal electors, have the appellation of, *your electoral serenity*. Foreign kings style the temporal electors, and those of the spiritual who were princes born, *brothers*. The spiritual are also styled, *highly and most worthy*; and the temporal, *most illustrious*.

The elector of Mentz is arch-chancellor of the holy Roman empire in Germany, and director of the electoral college. This prince notifies the death of an 25
Powers of
the electors.

23
Powers of
the emper-
or.

The elector of Treves is the arch-chancellor of the holy Roman empire in Gaul and the kingdom of Arles; but this at present is only a bare title. At an election of the king of the Romans, he has the first voice; and, before the election, takes the oath of the elector of Mentz.

The elector of Cologne is arch-chancellor of the holy Roman empire in Italy. At an election of a king of the Romans, he has the second voice; and he crowns the emperor, when the coronation is at Aix-la-Chapelle, and in the archbishopric of Cologne.

The king and elector of Bohemia is arch-bearer of the holy Roman empire, precedes all the temporal electors whatsoever, and has the third voice in the electoral college.

The elector of Bavaria is arch-fewer of the holy Roman empire. At the coronation he carries the *monde* before the emperor, ranks next to Bohemia, places four silver dishes, weighing twelve marks, on the imperial table, and serves up the first course.

The elector of Saxony is arch-marshal of the holy Roman empire. He also, when there is no emperor, is one of the vicars of the empire. At the diets, and on other solemn occasions, he carries the sword of state before the emperor; and, at the coronation, he rides into a heap of oats, and fills a silver measure with that grain. During the holding of the diets, he has jurisdiction over all electoral and other officers of the states of the empire, as also in criminal matters. When the see of Mentz is vacant, he holds the directory of the diet, and the right of protection over the imperial city of Mullhausen, and all trumpeters throughout the Roman empire.

The elector of Brandenburg is arch-chamberlain of the holy Roman empire; carries the sceptre before the emperor, which he bears also in his coat of arms; presents the emperor with water in a silver basin in order to wash himself; may proceed with respect to his fiefs, principalities, and lands, as with allodial estates; and, at his own pleasure, impose new tolls, and erect mills on all rivers.

The elector Palatine was formerly arch-fewer, but since the treaty of Westphalia arch-treasurer. This house has the right of protection over all the braziers of a large district, and throughout all Germany is protector of the order of St. John; can raise nobles and gentlemen to the degree of counts; and has the right of vengery, by virtue of which, all illegitimate persons, and others of foreign countries, who within a year and a day have no succeeding lord, may be made bondsmen in such places as are subject to his jurisdiction; so that they must bind themselves to the duties of the

electorate, and to the payment of a certain tribute and mortuaries.

When the elector of Bavaria was put under the ban of the empire in 1706, the Palatine recovered the office of arch-fewer, and the elector of Brunswick-Lunenbourg obtained the office of arch-treasurer, by which he still files himself, till another suitable arch-office be conferred on him. He enjoys the alternate succession in the bishopric of Osnaburg, together with some other rights and privileges.

Without the privity of these electors, the emperor can do nothing with regard to leagues and wars of the empire, alienations and mortgages of lands belonging to it, &c. At their investiture they pay no fees, and a new-elected emperor must immediately confirm their privileges and dignities. The diets are held by the emperor, with the consent of the electors; and, at their desire, each elector enjoys a right of appointing two chamber-court assessors, and their electorates have an unlimited privilege *de non appellando*. They may meet together, and hold what are called *electoral diets*. A subject may be guilty of treason against them; and their whole electorates descend to their first-born. By the imperial capitulation, their envoys are to take place of princes in person.

Next to the electors are the princes of the empire, who are also partly spiritual, and partly temporal. The spiritual are archbishops, bishops, abbots, provosts, abbesses, the masters of the Teutonic order, and of St John; but of these, some have each a voice, and others vote by colleges. The temporal princes are dukes, marquises, counts, viscounts, and barons; of which, as among the spiritual, the higher have single voices, but the lower vote by colleges.

Not only all those princes who have seat and voice in the diet, but many others, are vested with sovereign power in their respective territories, or at least are under very few restraints. They are, indeed, more free and absolute than some crowned heads; but still they are subject to the general laws of the empire, and sworn not to engage in any wars or alliances to the prejudice of the emperor and empire. But here it is to be observed, that many have titles of nobility though they are no sovereigns, nor have any seat in the diets: some, however, have a seat, that do not hold immediately of the emperor; or, which is the same, are immediately subject to some other prince, and only mediately to the emperor. The Franks, in imitation of the Romans, reduced all Germany into provinces, over which they placed governors with different titles. They were generally of noble families; and, if there was no material objection against it, their sons were appointed to succeed them: from whence these governors came at length to insist on a right of succeeding their ancestors, and refused to pay homage to the German emperors, every one taking upon him to exercise regal power in his province; from whence have sprung up so many petty sovereigns in the empire. These officers were either *herzogen* or dukes, to whom were committed the government of the larger districts; *graffen*, or earls, who had the care of smaller parts; *pfaltz-graven*, *palgraves*, or counts-palatine, who administered justice when in the verge of the court; *landgraver*, who were set over provinces; *margraves*, or marquises, who were charged with

Germany.

with the care of the marches or borders; and *burggraves*, who were governors of the royal castles and forts. The third college of the diet is that of the free or imperial cities, *i. e.* such as are governed by magistrates of their own, and stand immediately under the emperor and empire. Some of these are wholly Catholic, others entirely Lutheran, and others again mixed. Within their territory they exercise supreme power; and are divided into two benches, the Rhenish and Saxonian. As the princes of the empire took advantage of the necessities or indulgence of the German emperors, to erect the governments they held in capacity of viceroys or governors, into independent principalities and states, so did the cities now called *free* and *imperial*. The emperors, frequently wanting supplies of money to carry on wars, or for other occasions, borrowed large sums of the wealthy trading towns, and paid them again in munificent grants and privileges, making them free states, and independent of the governors of the provinces where they stood: accordingly, these cities, like the princes, exercise all kinds of sovereign power that are consistent with the general laws of the empire; they make laws, constitute courts of justice, coin money, raise forces, and enter into alliances and confederacies; only acknowledging the emperor for their supreme lord, and contributing their share towards the common defence of the empire.

27
Powers of
the diet.

The diet meets at Ratibon on the emperor's summons, and any of the princes may send their deputies thither in their stead. The diet makes laws, raises taxes, determines differences between the several princes and states, and can relieve subjects from the oppressions of their sovereign: and there are two supreme councils, called the *aulic council*, and the *chamber of Witzlar*, to which any of the princes and states, or their subjects, may appeal, when they apprehend themselves aggrieved. The empire was anciently divided into ten circles; which division was confirmed by the emperor Charles V. who settled the portion which every circle, and every prince and member of each circle, should contribute towards the ordinary and extraordinary taxes of the empire. This was entered in a register, called a *matriculation-book*, which is kept by the elector of Mentz. The taxes are either ordinary or extraordinary. The former is what is styled the *chamber-terms*, or the money which each state of the empire is to contribute annually for maintaining the chamber-judiciary of the emperor and empire. The latter are called *Roman months*, which are a certain rate of money or troops settled by the states of the empire, and granted sometimes to the emperor; as for instance, for the support of the emperor, or of the army of the empire, or the forts thereof, or for the war against the Turks, the expenses of an embassy of the empire, &c. By the matricula settled by Charles V. twelve florins were to be paid monthly in lieu of every horseman, and four for every foot soldier. Afterwards it was enacted, that sixty florins should be advanced in lieu of every trooper wanting, and twelve for every footman; and these payments obtained the name of *Roman months*, because the forces or money abovementioned were at first applied towards the forming a body of horse and foot for six months, to conduct the emperor in

his journey to Rome to receive the papal coronation.

Besides the diet, there are yearly meetings of the states of one, two, or three of the circles that lie nearest to one another, called from thence *corresponding circles*; of which there are three classes: first, the Upper Rhine, Lower Rhine, and Westphalia; secondly, the Upper and Lower Saxony; and, thirdly, Franconia, Suabia, and Austria. That of Upper Saxony assembles usually at Leipzig; that of Franconia at Nuremberg; and that of Suabia at Ulm. They treat of the regulation of their coin, the public peace, their treasure, magazines, fortifications, and commerce, rectifying the matricula, putting the decrees of the empire in execution, and appointing judges of the imperial chamber of Witzlar or Spire, and of the aulic council at Vienna; and have power of enacting laws which are not inconsistent with the constitution of the empire. In every circle there are one or two directors, who summon the states of the circle, and have the command of the militia when embodied, regulating their march, quarters, &c. and putting the decrees of the empire in execution, when any prince or member refuses to comply with their resolutions. It is to be observed here, that the Protestant states of the empire, in the diets, are called the *evangelic body*, and have a director, viz. the elector of Saxony. Besides the higher nobility, or high *adel* of the empire, consisting of princes, counts, &c. there is the lower *adel*, or rank of knighthood, which is very numerous in Germany.

28
Annual
meetings of
the states.

With regard to the character of the ancient Germans, they are described to us by the Greek and Roman writers, as resembling the Gauls, and differing from other nations by the largeness of their stature, ruddy complexion, blue eyes, and yellow bushy hair, haughty and threatening looks, strong constitutions, and being proof against hunger, cold, and all kinds of hardship.

29
Character
of the ancient
Germans.

Their native disposition displayed itself chiefly in their martial genius, and in their singular fidelity. The former of these they did indeed carry to such an excess, as came little short of downright ferocity: but, as to the latter, they not only valued themselves highly upon it, but were greatly esteemed by other nations for it; inasmuch that Augustus, and several of his successors, committed the guard of their persons to them, and almost all other nations either courted their friendship and alliance, or hired them as auxiliaries: though it must be owned, at the same time, that their extreme love of liberty, and their hatred of tyranny and oppression, have often hurried them to treachery and murder, especially when they have thought themselves ill used by those who hired them; for, in all such cases, they were easily stirred up, and extremely vindictive. In other cases, Tacitus tells us, they were noble, magnanimous, and beneficent, without ambition to aggrandize their dominions, or invading those from whom they received no injury; rather choosing to employ their strength and valour defensively, than offensively; to preserve their own, than to ravage their neighbours.

Their friendship and intercourse was rather a compound of honest bluntness and hospitality, than of wit, humour, or gallantry. All strangers were sure

Germany. to meet with a kind reception from them, to the utmost of their ability: even those who were not in a capacity to entertain them, made it a piece of duty to introduce them to those who could; and nothing was looked upon as more scandalous and detestable, than to refuse them either the one or the other. They do not seem, indeed, to have had a taste for grand and elegant entertainments; they affected in every thing, in their houses, furniture, diet, &c. rather plainness and simplicity, than sumptuousness and luxury. If they learned the Romans and Gauls the use of money, it was rather because they found it more convenient than their ancient way of bartering one commodity for another; and then they preferred those ancient coins which had been stamped during the times of the Roman liberty, especially such as were either milled or cut in the rims, because they could not be so easily cheated in them, as in some others, which were frequently nothing but copper, or iron, plated over with silver. This last metal they likewise preferred before gold, not because it made a greater show, but because it was more convenient for buying and selling: And as they became, in time, more feared by, or more useful to, the Romans; so they learned how to draw enough of it from them to supply their whole country, besides what flowed to them from other nations.

As they despised superfluities in other cases, so they did also in the connubial way: every man was contented with one wife, except some few of their nobles, who allowed themselves a plurality, more for show than pleasure; and both were so faithful to each other, and chaste, true, and disinterested, in their conjugal affections, that Tacitus prefers their manners, in this respect, to those of the Romans. The men sought not dowries from their wives, but bestowed them upon them. Their youth, in those cold climates, did not begin so soon to feel the warmth of love, as they do in hotter ones: it was a common rule with them, not to marry young; and those were most esteemed who continued longest in celibacy, because they looked upon it as an effectual means to make them grow tall and strong; and to marry, or be concerned with a woman, before they were full twenty-years old, was accounted shameful wantonness. The women shared with their husbands not only the care of their family, and the education of their children, but even the hardships of war. They attended them in the field, cooked their victuals for them, dressed their wounds, stirred them up to fight manfully against their enemies, and sometimes have by their courage and bravery recovered a victory when it was upon the point of being snatched from them. In a word, they looked upon such constant attendance on them, not as a servitude, like the Roman dames, but as a duty and an honour. But what appears to have been still an harder fate upon the ancient German dames was, that their great Odinus excluded all those from his *valhalla*, or paradise, who did not, by some violent death, follow their deceased husbands thither. Yet notwithstanding their having been anciently in such high repute for their wisdom, and supposed spirit of prophecy, and their continuing such faithful and tender helpmates to their husbands, they sunk, in time, so low in their esteem, that, according to the

old Saxon law, he that hurt or killed a woman, was to pay but half the fine that he should have done if he had hurt or killed a man.

There is scarcely any one thing in which the Germans, though so nearly allied in most of their other customs to the Gauls, were yet more opposite to them than in their funerals. Those of the latter were performed with great pomp and profusion; those of the former were done with the same plainness and simplicity which they observed in all other things: the only grandeur they affected in them was, to burn the bodies of their great men with some peculiar kinds of wood; but then the funeral pile was neither adorned with the cloaths and other fine furniture of the deceased, nor perfumed with fragrant herbs and gums: each man's armour, that is, his sword, shield, and spear, were flung into it, and sometimes his riding-horse. The Danes, indeed, flung into the funeral-pile of a prince, gold, silver, and other precious things, which the chief mourners, who walked, in a gloomy guise, round the fire, exhorted the bystanders to fling liberally into it in honour of the deceased. They afterwards deposited their ashes in urns, like the Gauls, Romans, and other nations; as it plainly appears, from the vast numbers which have been dug up all over the country, as well as from the sundry dissertations which have been written upon them by several learned moderns of that nation. One thing we may observe, in general, that, whatever sacrifices they offered for their dead, whatever presents they made to them at their funerals, and whatever other superstitious rites they might perform at them, all was done in consequence of those excellent notions which their ancient religion had taught them, the immortality of the soul, and the bliss or misery of a future life.

It is impossible, indeed, as they did not commit anything to writing till very lately, and as none of the ancient writers have given us any account of it, to guess how soon the belief of their great Odin, and his paradise, was received among them. It may, for aught we know, have been older than the times of Tacitus, and he have known nothing of it, by reason of their scrupulous care in concealing their religion from strangers; but as they conveyed their doctrines to posterity by songs and poems, and most of the northern poets tell us that they have drawn their intelligence from those very poems which were still preserved among them; we may rightly enough suppose, that whatever doctrines are contained in them, were formerly professed by the generality of the nation, especially since we find their ancient practice so exactly conformable to it. Thus, since the surest road to this paradise was, to excel in martial deeds, and to die intrepidly in the field of battle; and since none were excluded from it but base cowards, and betrayers of their country; it is natural to think, that the signal and excessive bravery of the Germans flowed from this ancient belief of theirs: and, if their females were so brave and faithful, as not only to share with their husbands all the dangers and fatigues of war, but, at length, to follow them, by a voluntary death, into the other world; it can hardly be attributed to anything else but a strong persuasion of their being admitted to live with them in that place of bliss. This belief, therefore, whether received originally from the old Celtes,

³⁰
Their funerals.

³¹
Their belief of a future state.

Germany.

or afterwards taught them by the since deified Odin, seems, from their general practice, to have been universally received by all the Germans, though they might differ one from another in their notions of that future life.

The notion of a future happiness obtained by martial exploits, especially by dying sword in hand, made them bewail the fate of those who lived to an old age, as dishonourable here, and hopeless hereafter: upon which account, they had a barbarous way of sending them into the other world, willing or not willing. And this custom lasted several ages after their receiving Christianity, especially among the Prussians and Venidi; the former of whom, it seems, dispatched, by a quick death, not only their children, the sick, servants, &c. but even their parents, and sometimes themselves: and among the latter we have instances of this horrid parricide being practised even in the beginning of the 14th century. All that need be added is, that, if those persons, thus supposed to have lived long enough, either desired to be put to death, or, at least, seemed cheerfully to submit to what they knew they could not avoid, their exit was commonly preceded with a fast, and their funeral with a feast; but if they endeavoured to shun it, as it sometimes happened, both ceremonies were performed with the deepest mourning. In the former, they rejoiced at their deliverance, and being admitted into bliss; in the latter, they bewailed their cowardly excluding themselves from it. Much the same thing was done towards those wives, who betrayed a backwardness to follow their dead husbands.

We must likewise observe, that, in these funerals, as well as in all their other feasts, they were famed for drinking to excess; and one may say of them, above all the other descendants of the ancient Celtes, that their hospitality, banquets, &c. consisted much more in the quantity of strong liquors, than in the elegance of eating. Beer and strong mead, which were their natural drink, were looked upon as the chief promoters of health, strength, fertility, and bravery; upon which account, they made no scruple to indulge themselves to the utmost in them, not only in their feasts, and especially before an engagement, but even in their common meals.

The modern Germans in their persons are tall, fair, and strong built. The ladies have generally fine complexions; and some of them, especially in Saxony, have all the delicacy of features and shape that are so bewitching in a certain island of Europe.

Both men and women affect rich dresses, which in fashion are the same as in France and England; but the better sort of men are excessively fond of gold and silver lace, especially if they are in the army. The ladies at the principal courts differ not much in their dresses from the French and English, only they are not so excessively fond of paint as the former. At some courts they appear in rich furs; and all of them are loaded with jewels, if they can obtain them. The female part of the burghers families, in many German towns, dress in a very different manner, and some of them inconceivably fantastic, as may be seen in many prints published in books of travels: but in this respect they are gradually reforming, and many of them make quite a different appearance in their dresses from

what they did thirty or forty years ago. As to the peasantry and labourers, their dresses as in other parts of Europe, according to their employments, convenience, and opulence. In Westphalia, and most other parts of Germany, they sleep between two featherbeds, or rather the upper one of down, with sheets stitched to them, which by use becomes a very comfortable practice. The most unhappy part of the Germans are the tenants of little needy princes, who squeeze them to keep up their own grandeur; but, in general, the circumstances of the common people are far preferable to those of the French.

The Germans are naturally a frank, honest, hospitable people, free from artifice and disguise. The higher orders are ridiculously proud of titles, ancestry, and shew. The Germans, in general, are thought to want animation, as their persons promise more vigour and activity than they commonly exert, even in the field of battle. But when commanded by able generals, especially the Italians, such as Montecuculi and prince Eugene, they have done great things, both against the Turks and the French. The imperial arms have seldom made any remarkable figure against either of those two nations, or against the Swedes or Spaniards, when commanded by German generals. This possibly might be owing to the arbitrary obliquity of the court of Vienna; for in the two last wars the Austrians exhibited prodigies of military valour and genius.

Industry, application, and perseverance, are the great characteristics of the German nation, especially the mechanical part of it. Their works of art would be incredible were they not visible, especially in watch and clock making, jewellery, turnery, sculpture, drawing, painting, and certain kinds of architecture. The Germans have been charged with intemperance in eating and drinking; and perhaps not unjustly, owing to the vast plenty of their country in wine and provisions of every kind. But those practices seem now to be wearing out. At the greatest tables, though the guests drink pretty freely at dinner, yet the repast is commonly finished by coffee, after three or four public toasts have been drank. But no people have more feasting at marriages, funerals, and birth-days.

The German nobility are generally men of so much honour, that a sharper in other countries, especially in England, meets with more credit if he pretends to be a German, than of any other nation.

The merchants and tradesmen are very civil and obliging. All the sons of noblemen inherit their fathers titles, which greatly perplexes the heralds and genealogists of that country. This perhaps is one of the reasons why the German husbands are not quite so complaisant as they ought otherwise to be to their ladies, who are not entitled to any pre-eminence at the table; nor indeed do they seem to affect it, being far from either ambition or loquacity, though they are said to be somewhat too fond of gaming. From what has been premised, it may easily be conceived, that many of the German nobility, having no other hereditary estate than a high-sounding title, easily enter into their armies, and those of other sovereigns. Their fondness for title is attended with many other inconveniences. Their princes think that the cultivation of their lands, tho' it may treble their revenue,

Germany.

32
Remarkable for drinking to excess.

33
Character of the modern Germans.

is below their attention; and that, as they are a species of beings superior to labourers of every kind, they would demean themselves in being concerned in the improvement of their grounds.

The domestic diversions of the Germans are the same as in England; billiards, cards, dice, fencing, dancing, and the like. In summer, people of fashion repair to places of public resort, and drink the waters. As to their field-diversions, besides their favourite one of hunting, they have bull and bear-beating, and the like. The inhabitants of Vienna live luxuriously, a great part of their time being spent in feasting and carousing; and in winter, when the several branches of the Danube are frozen over, and the ground covered with snow, the ladies take their recreations in sledges of different shapes, such as griffins, tygers, swans, scollop-shells, &c. Here the lady sits, dressed in velvet lined with rich furs, and adorned with laces and jewels, having on her head a velvet cap; and the sledge is drawn by one horse, flag, or other creatures let off with plumes of feathers, ribbons, and bells. As this diversion is taken chiefly in the night-time, servants ride before the sledge with torches, and a gentleman sitting on the sledge behind guides the horse.

GERMEN, the feed-bud; defined by Linnaeus to be the base of the pistillum, which contains the rudiments of the seed; and, in progress of vegetation, swells and becomes the seed-vessel.

In assimilating the vegetable and animal kingdoms, Linnaeus denominates the feed-bud the *ovarium* or *uterus* of plants; and affirms its existence to be chiefly at the time of the dispersion of the male-dust by the antheræ; as, after its impregnation, it becomes a seed-vessel.

GERMEN, by Pliny and the ancient botanists, is used to signify a bud containing the rudiments of the leaves. See GEMMA.

GERMINATIO, among botanists, comprehends the precise time which the seeds take to rise after they have been committed to the soil.—The different species of seeds are longer or shorter in rising, according to the degree of heat which is proper to each. Millet, wheat, and several of the grasses, rise in one day; blite, spinach, beans, mullard, kidney-beans, turneps, and rocket, in three days; lettuce and dill, in four; cucumber, gourd, melon, and cress, in five; radish and beet, in six; barley, in seven; orach, in eight; purslane, in nine; cabbage, in ten; hyssop, in thirty; parsley, in forty or fifty days; peach, almond, walnut, chestnut, peony, horned-poppy, hyppocum, and ranunculus scabatus, in one year; rose-bush, cornel-tree, hawthorn, medlar, and hazel-nut, in two. The seeds of some species of orchis, and of some hiliaceous plants, never rise at all. Of seeds, some require to be sowed almost as soon as they are ripe, otherwise they will not sprout or germinate. Of this kind are the seeds of coffee and fraxinella. Others, particularly those of the pea-bloom flowers, preserve their germinating faculty for a series of years.—Mr Adanson asserts, that the sensitive plant retains that virtue for thirty or forty years.

Air and water are the agents of germination. The humidity of the air alone makes several seeds to rise that are exposed to it. Seeds too are observed to rise in water, without the intervention of earth: but water, without air, is insufficient.—Mr Homberg's experiments on this head are decisive. He put several seeds

under the exhausted-receiver of an air-pump, with a view to establish something certain on the causes of germination. Some of them did not rise at all; and the greatest part of those which did, made very weak and feeble productions.

Thus it is for want of air that seeds which are buried at a very great depth in the earth, either thrive but indifferently, or do not rise at all.

They frequently preserve, however, their germinating virtue for many years, within the bowels of the earth; and it is not unusual, upon a piece of ground being newly dug to a considerable depth, to observe it soon after covered with several plants, which had not been seen there in the memory of man.

Were this precaution frequently repeated, it would doubtless be the means of recovering certain species of plants which are regarded as lost; or which perhaps, never coming to the knowledge of botanists, might hence appear the result of a new creation.

Some seeds require a greater quantity of air than others. Thus purslane, which does not rise till after lettuce in the free air, rises before it *in vacuo*; and both prosper but little, or perish altogether, whilst cresses vegetate as freely as in the open air.

GERVAISE, (or GERVASE), of Tilbury, a famous English writer of the 13th century; thus named from his being born at Tilbury on the Thames. He was nephew to Henry II. king of England; and was in great credit with Otto IV. emperor of Germany, to whom he dedicated a Description of the world, and a Chronicle. He also composed a history of England, that of the Holy Land, and other works.

GERUND, is grammar, a verbal noun of the neuter gender, partaking of the nature of a participle, declinable only in the singular number, through all the cases except the vocative; as *nom. amandum*, *gen. amandi*, *dat. amando*, *accus. amandum*, *abl. amando*. The word is formed of the Latin *gerundivus*, and that from the verb *gerere*, "to bear."

The *gerund* expresses not only the time, but also the manner, of an action; as, "he fell in running post."—It differs from the participle, in that it expresses the time, which the participle does not; and from the tense properly so called, in that it expresses the manner, which the tense does not.

Grammarians are much embarrassed to settle the nature and character of the *gerunds*. It is certain they are not verbs, nor distinct moods of verbs, in regard they do not mark any judgment, or affirmation of the mind, which is the essence of a verb. And, beside, they have cases; which verbs have not. Some, therefore, will have them to be adjectives passive, whose substantive is the infinitive of the verb: on this footing they denominate them *verbal nouns*, or names formed of verbs, and retaining the ordinary regimen thereof. Thus, say they, *tempus est legendi libros*, or *librorum*, is as much as to say, *tempus est ut legere libros*, vel *librorum*. But others stand up against this decision.

GESNER (Conrad), a celebrated physician and naturalist, was born at Zurich in 1516. Having finished his studies in France, he travelled into Italy, and taught medicine and philosophy in his own country with extraordinary reputation. He was acquainted with the languages; and excelled so much in natural history, that he was furnished the *Pliny of Germany*.

Gestation

Ghent.

many. He died in 1566, leaving many works behind him; the principal of which are, 1. A history of animals, plants, and fossils; 2. *Bibliotheca Universalis*; 3. A Greek and Latin lexicon.

GESTATION, among physicians. See **PREGNANCY**.

GESTRICIA, a province of Sweden, bounded by Helsingia on the north, by the Bothnic gulph on the east, by Upland on the south, and by Dalecarlia on the west.

GESTURE, in rhetoric, consists chiefly in the proper action of the hands and face. See **DECLAMATION**, n° xii. and **ORATORY**, n° 130, 131.

GETHIN (Lady Grace), an English lady of uncommon parts, was the daughter of Sir George Norton of Abbots-Leigh in Somersetshire, and born in the year 1676. She had all the advantages of a liberal education; and became the wife of Sir Richard Gethin, of Gethin-Grott in Ireland. She was mistress of great accomplishments, natural and acquired, but did not live long enough to display them to the world; for she died in the 21st year of her age. She was buried in Westminster-abbey, where a beautiful monument with an inscription is erected over; and, for perpetuating her memory, provision was made for a sermon to be preached in Westminster-abbey, yearly, on Ash-Wednesday for ever. She wrote; and left behind her, in loose papers, a work, which, soon after her death, was methodized, and published under the title of "*Reliquiæ Gethinianæ*:" or, Some remains of "the most ingenious and excellent lady, Grace lady "Gethin, lately deceased. Being a collection of choice "discourses, pleasant apophthegms, and witty sentences. Written by her, for the most part, by way "of essay, and at spare hours." Lond. 1700, 4to; with her picture before it.

GEUM, **AVENS**, or *Herb-Bennet*; a genus of the pentagynia order, belonging to the icosaandra class of plants. There are five species, of which the most remarkable are, 1. The arbutum, with thick fibrous roots of an aromatic taste, rough, serrated leaves, and upright, round, hairy stalks terminated by large yellow flowers, succeeded by globular fruit. 2. The rivale, with a very thick, fleshy, and fibrous root, hairy leaves, and upright stalks, 10 or 12 inches high, terminated by purple flowers nodding on one side. Of this there are varieties with red and with yellow flowers.—Both these are natives of Britain, and are easily propagated either by the root or seed. The roots of the first, gathered in the spring before the stem comes up, and infused in ale, give it a pleasant flavour, and prevent its growing four. Infused in wine, they have a stomachic virtue. The taste is mildly astringent and aromatic, especially when the plant grows in warm dry situations; but in moist shady places, it hath little virtue. Cows, goats, sheep, and swine, eat the plant; horses are not fond of it.—The powdered root of the second species will cure tertian agues, and is daily used for that purpose by the Canadians. Sheep and goats eat the plant; cows, horses, and swine, are not fond of it.

GHEENT, a city of the Austrian Netherlands, capital of the province of Flanders. It is seated on four navigable rivers, the Scheld, the Lys, the Lieve, and the Moere, which run through it, and divide it into

canals. These form 26 little isles, over which there are 300 bridges; among which there is one remarkable for a statue of brass of a young man who was obliged to cut off his father's head; but as he was going to strike, the blade flew into the air, and the hilt remained in his hand, upon which they were both pardoned. There is a picture of the whole transaction in the town-house. Ghent is surrounded with walls and other fortifications, and is tolerably strong for a place of its circumference. But all the ground within the walls is not built upon. The streets are large and well paved, the market-places spacious, and the houses built with brick. But the Friday's market-place is the largest, and is remarkable for the statue of Charles V. which stands upon a pedestal in the imperial habit. That of Cortere is remarkable for a fine walk under several rows of trees. In 1737 a fine opera-house was built here, and a guard-house for the garrison. Near the town is a very high tower, with a handsome clock and chimies. The great bell weighs 11,000 pounds.

This town is famous for the pacifications signed here, in 1526, for settling the tranquillity of the Seventeen Provinces, which was afterwards confirmed by the king of Spain. It was taken by Lewis XIV. in 1678, who afterwards restored it. The French took possession of it again after the death of Charles II. of Spain. In 1706, it was taken by the duke of Marlborough; and by the French, in 1708; but it was retaken the same year. Last of all, the French took it by surprise after the battle of Fontenoy; but at the peace of Aix la Chapelle, it was rendered back. This is the birth-place of John of Gaunt. It is very well seated for trade, on account of its rivers and canals. It carries on a great commerce in corn; and has linen, woollen, and silk manufactures. E. Long. 4. O. N. Lat. 51. 24.

GIAGH, in chronology, a cycle of 12 years; in use among the Turks and Cathayans.

Each year of the giagh bears a name of some animal: the first, that of a mouse; the second, that of a bullock; the third, of a lynx or leopard; the fourth, of a hare; the fifth, of a crocodile; the sixth, of a serpent; the seventh, of a horse; the eighth, of a sheep; the ninth, of a monkey; the tenth, of a hen; the eleventh, of a dog; and the twelfth, of a hog.

They also divide the day into 12 parts, which they call *giaghs*, and distinguish them by the name of some animals. Each giagh contains two of our hours, and is divided into eight kehs, as many as there are quarters in our hours.

GIALLOLINO, in natural history, a fine yellow pigment much used under the name of **NAPLES YELLOW**.

GIANT, a person of extraordinary bulk and stature.

The romances of all ages have furnished us with so many extravagant accounts of giants of incredible bulk and strength, that the existence of such people is now generally disbelieved. It is commonly thought, that the stature of man hath been the same in all ages; and some have even pretended to demonstrate the impossibility of the existence of giants mathematically. Of these our countryman M^r Laurin hath been the most explicit.

"In general, (says he), it will easily appear, that the efforts tending to destroy the cohesion of beams arising from

Ghent

Giant.

Giant.

from their own gravity only, increase in the quadruplicate ratio of their lengths; but that the opposite efforts tending to preserve their cohesion, increase only in the triplicate proportion of the same lengths. From which it follows, that the greater beams must be in greater danger of breaking than the lesser similar ones; and that though a lesser beam may be firm and secure, yet a greater similar one may be made so long, that it will necessarily break by its own weight. Hence Galileo justly concludes, that what appears very firm, and succeeds very well in models, may be very weak and infirm, or even fall to pieces by its own weight, when it comes to be executed in large dimensions according to the model.

"From the same principle he argues, that there are necessary limits in the operations of nature and art, which they cannot surpass in magnitude. Were trees of a very enormous size, their branches would fall by their own weight. Large animals have not strength in proportion to their size; and if there were any land-animals much larger than those we know, they could hardly move, and would be perpetually subject to the most dangerous accidents. As to the animals of the sea, indeed, the case is different; for the gravity of the water in a great measure sustains those animals; and in fact, these are known sometimes to be vastly larger than the greatest land-animals. Nor does it avail against this doctrine to tell us, that bones have sometimes been found which were supposed to have belonged to giants of immense size; such as the skeletons mentioned by Strabo and Pliny, the former of which was 60 cubits high, and the latter 46: for naturalists have concluded on just grounds, that in some cases these bones had belonged to elephants; and that the larger ones were bones of whales, which had been brought to the places where they were found by the revolutions of nature that have happened in past times. Though it must be owned, that there appears no reason why there may not have been men who have exceeded by some feet in height the tallest we have seen."

It will easily be seen, that arguments of this kind can never be conclusive; because, along with an increase of stature in any animal, we must always suppose a proportional increase in the cohesion of the parts of its body. Large works sometimes fail when constructed on the plan of models, because the cohesion of the materials whereof the model is made and of the large work are the same; but a difference in this respect will produce a very remarkable difference in the ultimate result. Thus, suppose a model is made of fir-wood, the model may be firm and strong enough; but a large work made also of fir, when executed according to the plan of the model, may be so weak that it will fall to pieces with its own weight. If, however, we make use of iron for the large work instead of fir, the whole will be sufficiently strong, even though made exactly according to the plan of the model. The like may be said with regard to large and small animals. If we could find an animal whose bones exceeded in hardness and strength the bones of other animals as much as iron exceeds fir, such an animal might be of a monstrous size, and yet be exceedingly strong. In like manner, if we suppose the flesh and bones of a giant to be greatly superior in hardness and strength to the

Giant.

bones of other men, the great size of his body will be no objection at all to his strength. The whole of the matter, therefore, concerning the existence of giants, must rest on the credibility of the accounts we have from those who pretend to have seen them, and not on any arguments drawn *a priori*.

In the scripture we are told of *giants*, who were produced from the marriages of the *sons of God* with the *daughters of men*. But of this passage no sufficient explanation hath yet been found: nor can we be sure that the word translated *giants* does there imply any extraordinary stature; seeing in other places it is explained by *falling away, revolting, or transgressing*. In other places of scripture, however, giants, with their dimensions, are mentioned in such a manner that we cannot possibly doubt; as in the case of Og king of Bashan, and Goliath. In a memoir read before the Academy of Sciences at Rouen, M. Le Cat gives the following account of giants that are said to have existed in different ages.

"Profane historians have given seven feet of height to Hercules their first hero; and in our days we have seen men eight feet high. The giant who was slain in Rouen, in 1735, measured eight feet some inches. The emperor Maximin was of that size; Skenkiss and Platerus, physicians of the last century, saw several of that stature; and Goropius faw a girl who was ten feet high.—The body of Orestes, according to the Greeks, was eleven feet and a half; the giant Galbarr, brought from Arabia to Rome under Claudius Cæsar, was near ten feet; and the bones of Secondilla and Pusio, keepers of the gardens of Salust, were but six inches shorter. Funnam, a Scotman, who lived in the time of Eugene II. king of Scotland, measured eleven feet and a half: and Jacob le Maire, in his voyage to the frighths of Magellan, reports, that, on the 17th of December 1615, they found at Port Desire several graves covered with stones; and having the curiosity to remove the stones, they discovered human skeletons of ten and eleven feet long. The chevalier Scory, in his voyage to the Pike of Teneriffe, says, that they found in one of the sepulchre caverns of that mountain the head of a Guanche which had 80 teeth, and that the body was not less than 15 feet long. The giant Ferragus, slain by Orlando nephew of Charlemagne, was 18 feet high. Rioland, a celebrated anatomist, who wrote in 1614, says, that some years before there was to be seen in the suburbs of St Germain the tomb of the giant Iforet, who was 20 feet high. In Rouen, in 1509, in digging in the ditches near the Dominicans, they found a stone-tomb containing a skeleton whose skull held a bushel of corn, and whose shin-bone reached up to the girdle of the tallest man there, being about four feet long, and consequently the body must have been 17 or 18 feet high. Upon the tomb was a plate of copper, whereon was engraved, "In this tomb lies the noble and puissant lord, the chevalier Ricon de Vallenmont, and his bones." Platerus, a famous physician, declares, that he saw at Lucerne the true human bones of a subject which must have been at least 19 feet high. Valence in Dauphiné boasts of possessing the bones of the giant Bucart, tyrant of the Vivarais, who was slain by an arrow by the count De Cabillon his vassal. The Dominicans had a part of the shin-bone, with the articulation near

Giant.

of the knee, and his figure painted in fresco, with an inscription, shewing that this giant was 22 feet and a half high, and that his bones were found in 1705, near the banks of the Morderi, a little river at the foot of the mountain of Crussol, upon which (tradition says) the giant dwelt.

"January 11. 1613, some masons digging near the ruins of a castle in Dauphiné, in a field which (by tradition) had long been called *the giant's field*, at the depth of 18 feet discovered a brick-tomb 30 feet long, 12 feet wide, and 8 feet high; on which was a grey stone, with the words *Theutobochus Rex* cut thereon. When the tomb was opened, they found a human skeleton entire, 25 feet and a half long, 10 feet wide across the shoulders, and five feet deep from the breast-bone to the back. His teeth were about the size each of an ox's foot, and his shin-bone measured four feet. —Near Mazarino, in Sicily, in 1516, was found a giant 30 feet high; his head was the size of an hog's head, and each of his teeth weighed five ounces. Near Palermo, in the valley of Mazara, in Sicily, a skeleton of a giant 30 feet long was found, in the year 1548; and another of 33 feet high, in 1550; and many curious persons have preserved several of these gigantic bones.

"The Athenians found near their city two famous skeletons, one of 34 and the other of 36 feet high.

"At Totu, in Bohemia, in 758, was found a skeleton, the head of which could scarce be encompassed by the arms of two men together, and whose legs, which they still keep in the castle of that city, were 26 feet long. The skull of the giant found in Macedonia, September 1691, held 210 pounds of corn.

"The celebrated Sir Hans Sloane, who treated this matter very learnedly, does not doubt these facts; but thinks the bones were those of elephants, whales, or other enormous animals.

"Elephants bones may be shewn for those of giants; but they can never impose on connoisseurs. Whales, which, by their immense bulk, are more proper to be substituted for the largest giants, have neither arms nor legs; and the head of that animal hath not the least resemblance to that of a man. If it be true, therefore, that a great number of the gigantic bones which we have mentioned have been seen by anatomists, and by them have been reputed real human bones, the existence of giants is proved."

With regard to the credibility of all, or any of these accounts, it is difficult to determine any thing. If, in any castle of Bohemia, the bones of a man's leg 26 feet in length are preserved, we have indeed a decisive proof of the existence of a giant, in comparison of whom most others would be but pigmies. Nor indeed could these bones be supposed to belong to an elephant; for an elephant itself would be but a dwarf in comparison of such an enormous monster. But if these bones were really kept in any part of Bohemia, it seems strange that they have not been frequently visited, and particular descriptions of them given by the learned who have travelled into that country.—It is certain, however, that there have been nations of men considerably exceeding the common stature. Thus, all the Roman historians inform us, that the Gauls and Germans exceeded the Italians in size, and it appears that the Italians in those days were of much the same stature with the people of the present age. Among

Vol. V.

these northern nations, it is also probable, that there would be as great differences in stature, as there are among the present race of men. If that can be allowed, we may easily believe that some of these barbarians might be called *giants*, without any great impropriety. Of this superiority of size, indeed, the historian Florus gives a notable instance in Teutobochus, above-mentioned, king of the Teutones; who being defeated and taken prisoner by Marius, was carried in triumph before him at Rome, when his head reached above the trophies that were carried in the same procession.

But whether these accounts are credited or not, we are very certain, that the stature of the human body is by no means absolutely fixed. We are ourselves a kind of giants in comparison of the Laplanders; nor are these the most diminutive people to be found upon the earth. The abbe la Chappe, in his journey into Siberia in order to observe the last transit of Venus, passed through a village inhabited by people called *Wotacks*, neither men nor women of whom were above four feet high. The accounts of the Patagonians also, which cannot be entirely discredited, render it very probable, that somewhere in South America there is a race of people very considerably exceeding the common size of mankind, and consequently that we cannot altogether discredit the relations of giants handed down to us by ancient authors; though what degree of credit we ought to give them, is not easy to be determined.

GIANTS-Causeway, a vast collection of Basaltic pillars in the county of Antrim in Ireland. See the article BASALTIC.

The principal or grand causeway, for there are several less considerable and scattered fragments of similar workmanship, consists of a most irregular arrangement of many hundred thousands of columns of a black kind of rock, hard as marble: almost all of them are of a pentagonal figure, but so closely and compactly situated on their sides, though perfectly distinct from top to bottom, that scarce any thing can be introduced between them. The columns are of an unequal height and breadth; some of the highest, visible above the surface of the strand, and at the foot of the impending angular precipice, may be about 20 feet; they do not exceed this height, at least none of the principal arrangement. How deep they are fixed in the strand, was never yet discovered. This grand arrangement extends nearly 200 yards, visible at low water; how far beyond, is uncertain: from its declining appearance, however, at low water, it is probable it does not extend under water to a distance any thing equal to what is seen above. The breadth of the principal causeway, which runs out in one continued range of columns, is, in general, from 20 to 30 feet; at one place or two it may be nearly 40 for a few yards. In this account are excluded the broken and scattered pieces of the same kind of construction, that are detached from the sides of the grand causeway, as they do not appear to have ever been contiguous to the principal arrangement, though they have frequently been taken into the width; which has been the cause of such wild and dissimilar representations of this causeway, which different accounts have exhibited. The highest part of this causeway is the narrowest at the

18 Y

very

Giant.

very foot of the impending cliff, from whence the whole projects, where, for four or five yards, it is not above ten or fifteen feet wide. The columns of this narrow part incline from a perpendicular a little to the westward, and form a slope on their tops, by the very unequal height of the columns on the two sides, by which an ascent is made at the foot of the cliff, from the head of one column to the next above, *gradatim*, to the top of the great causeway, which, at the distance of half a dozen yards from the cliff, obtains a perpendicular position, and, lowering in its general height, widens to about 20 or between 20 and 30 feet, and for 100 yards nearly is always above water. The tops of the columns for this length being nearly of an equal height, they form a grand and singular parade, that may be easily walked on, rather inclining to the water's edge. But from high water-mark, as it is perpetually washed by the beating surges on every return of the tide, the platform lowers considerably, and becomes more and more uneven, so as not to be walked on but with the greatest care. At the distance of 150 yards from the cliff, it turns a little to the east for 20 or 30 yards, and then links into the sea. The figure of these columns is almost unexceptionably pentagonal, or composed of five sides; there are but very few of any other figure introduced: some few there are of three, four, and six sides, but the generality of them are five-sided, and the spectator must look very nicely to find any of a different construction: yet what is very extraordinary, and particularly curious, there are not two columns in ten thousand to be found, that either have their sides equal among themselves, or whose figures are alike. Nor is the composition of these columns or pillars less deserving the attention of the curious spectator. They are not of one solid stone in an upright position; but composed of several short lengths, curiously joined, not with flat surfaces, but articulated into each other like ball and socket, or like the joints in the vertebrae of some of the larger kind of fish, the one end at the joint having a cavity, into which the convex end of the opposite is exactly fitted. This is not visible, but by disjoining the two stones. The depth of the concavity or convexity is generally about three or four inches. And what is still farther remarkable of the joint, the convexity, and the correspondent concavity, is not conformed to the external angular figure of the column, but exactly round, and as large as the size or diameter of the column will admit; and, consequently, as the angles of these columns are, in general, extremely unequal, the circular edges of the joint are seldom coincident with more than two or three sides of the pentagonal, and from the edge of the circular part of the joint to the exterior sides and angles they are quite plain. It is still farther very remarkable, likewise, that the articulations of these joints are frequently inverted; in some the concavity is upwards, in others the reverse. This occasions that variety and mixture of concavities and convexities on the tops of the columns, which is observable throughout the platform of this causeway, yet without any discoverable design or regularity with respect to the number of either. The length, also, of these particular stones, from joint to joint, is various: in general, they are from 18 to 24 inches long; and, for the most part, longer toward the bottom of

the columns than nearer the top, and the articulation of the joints something deeper. The size, or diameter, likewise, of the columns is as different as their length and figure; in general, they are from 15 to 20 inches in diameter. There are really no traces of uniformity or design discovered throughout the whole combination, except in the form of the joint, which is invariably by an articulation of the convex into the concave of the piece next above or below it; nor are there any traces of a finishing in any part, either in height, length, or breadth, of this curious causeway. If there is here and there a smooth top to any of the columns above water, there are others just by, of equal height, that are more or less convex or concave, which shew them to have been joined to pieces that have been washed or by other means taken off. And undoubtedly those parts that are always above water have, from time to time, been made as even as might be; and the remaining surfaces of the joints must naturally have been worn smoother by the constant friction of weather and walking, than where the sea, at every tide, is beating upon it and continually removing some of the upper stones and exposing fresh joints. And farther, as these columns preserve their diameters from top to bottom, in all the exterior ones, which have two or three sides exposed to view, the same may, with reason, be inferred of the interior columns, whose tops only are visible. Yet what is very extraordinary, and equally curious, in this phenomenon, is, that notwithstanding the universal dissimilitude of the columns, both as to their figure and diameter, and though perfectly distinct from top to bottom, yet is the whole arrangement so closely combined at all points, that hardly a knife can be introduced between them either on the sides or angles. And it is really a most curious piece of entertainment to examine the close contexture and nice insertion of such an infinite variety of angular figures as are exhibited on the surface of this grand parade. From the infinite dissimilarity of the figure of these columns, this will appear a most surprising circumstance to the curious spectator; and would incline him to believe it a work of human art, were it not, on the other hand, inconceivable that the wit or invention of man should construct and combine such an infinite number of columns, which should have a general apparent likeness, and yet be so universally dissimilar in their figure, as that, from the minutest examination, not two in ten or twenty thousand should be found, whose angles and sides are equal among themselves, or of the one column to those of the other. That it is the work of nature, there can be no doubt to an attentive spectator, who carefully surveys the general form and situation, with the infinitely various figuration of the several parts of this causeway. There are no traces of regularity or design in the outlines of this curious phenomenon; which, including the broken and detached pieces of the same kind of workmanship, are extremely scattered and confused, and, whatever they might originally, do not, at present, appear to have any connection with the grand or principal causeway, as to any supposable design or use in its first construction, and as little design can be inferred from the figure or situation of the several constituent parts. The whole exhibition is, indeed, extremely confused, dissimilar, and destitute of every appearance

Giant,
Gibbous.

ance of use or design in its original construction. But what, beyond dispute, determines its original to have been from nature, is, that the very cliffs, at a great distance from the causeway, especially in the bay to the eastward, exhibit, at many places, the same kind of columns, figured and jointed in all respects like those of the grand causeway: some of them are seen near to the top of the cliff, which in general, in these bays to the east and west of the causeway, is near 300 feet in height; others again are seen about midway, and at different elevations from the strand. A very considerable exposure of them is seen in the very bottom of the bay to the eastward, near a hundred rods from the causeway, where the earth has evidently fallen away from them upon the strand, and exhibits a most curious arrangement of many of these pentagonal columns, in a perpendicular position, supporting, in appearance, a cliff of different strata of earth, clay, rock, &c. to the height of 150 feet or more, above. Some of these columns are between 30 and 40 feet high, from the top of the sloping bank below them; and, being longest in the middle of the arrangement, shortening on either hand in view, they have obtained the appellation of *organs*, from a rude likeness, in this particular to the exterior or frontal tubes of that instrument; and as there are few broken pieces on the strand near it, it is probable that the outside range of columns that now appears, is really the original exterior line, to the seaward, of this collection. But how far they extend internally into the bowels of the incumbent cliff, is unknown. The very substance, indeed, of that part of the cliff which projects to a point, between the two bays on the east and west of the causeway, seems composed of this kind of materials; for besides the many pieces that are seen on the sides of the cliff that circulate to the bottom of the bays, particularly the eastern side, there is, at the very point of the cliff, and just above the narrow and highest part of the causeway, a long collection of them seen, whose heads or tops just appearing without the sloping bank, plainly shew them to be in an oblique position, and about half-way between the perpendicular and horizontal. The heads of these, likewise, are of mixed surfaces, convex and concave, and the columns evidently appear to have been removed from their original upright, to their present inclining or oblique position, by the sinking or falling of the cliff.

GIBBOUS, a term in medicine, denoting any protuberance or convexity of the body, as a person haunched or hump-backed.

Infants are much more subject to gibbosity than adults, and it oftener proceeds from external than internal causes. A fall, blow, or the like, frequently thus distorts the tender bones of infants. When it proceeds from an internal cause, it is generally from a relaxation of the ligaments that sustain the spine, or a caries of its vertebrae; though the spine may be inflected forward, and the vertebrae thrown out by a too strong and repeated action of the abdominal muscles. This, if not timely redressed, grows up and fixes as the bones harden, till in adults it is totally irremediable: but when the disorder is recent, and the person young, there are hopes of a cure. The common method is by a machine of pasteboard, wood, or steel, which is made to press principally on the gibbous part; and

this by long wearing may set all right. The surgeons, however, have a different instrument, which they call a *crofs*; much more efficacious, though not quite so convenient in the wearing. By the use of this, the parts are always prevented from growing any worse, and are often cured. During the application of these assistances, the parts should be at times rubbed with hungary-water, spirit of lavender, or the like, and defended with a strengthening plaster.

GIBBOUS, in astronomy, a term used in reference to the enlightened parts of the moon, whilst she is moving from the first quarter to the full, and from the full to the last quarter: for all that time the dark part appears horned, or falcated; and the light one lunched out, convex, or gibbous.

GIELLINS, or GIBELINS, a famous faction in Italy, opposite to another called the GUELPHS.

These two factions ravaged and laid waste Italy for a long series of years; so that the history of that country, for the space of two centuries, is no more than a detail of their mutual violences and slaughters. The Gibelins stood for the emperor against the pope: but concerning their origin and the reason of their names, we have but a very obscure account. According to the generality of authors, they rose about the year 1240, upon the emperor Fredrick II.'s being excommunicated by the pope Gregory IX. Other writers maintain, that the two factions arose ten years before, though still under the same pope and emperor. But the most probable opinion is that of Maimbourg, who says, that the two factions of Guelphs and Gibelins arose from a quarrel between two ancient and illustrious houses on the confines of Germany, that of the Henries of Gibeling, and that of the Guelphs of Adorf. See (*History of*) ITALY.

GIBET, a machine in manner of a gallows, whereon notorious criminals, after execution, are hung in irons or chains, as spectacles in *terrorem*. See GALLOWs. —The word in French, *gibet*, properly denotes what we call gallows: it is supposed to come originally from the Arabic *gibel*, “mount, or elevation of ground;” by reason *gibets* are usually placed on hills or eminences.

GIBBET. See GIBET.

GIBRALTAR, a famous promontory, or rather peninsula, of Spain, lying in N. Lat. 35° 50', W. Long. 5° 35'. To the ancients it was known by the name of *Calpe*, and was also called one of the *Pillars of Hercules*; by the Arabians it is called *Gebel Tarek*, that is, the Mount of Tarek, from *Tarek*, the name of the Saracen general who conquered Spain in the beginning of the eighth century. The whole is an immense rock, rising perpendicularly about 440 yards, measuring, from north to south, about two English miles, but not above one in breadth from east to west. —The town lies along the bay on the west side of the mountain on a decline; by which, generally speaking, the rains pass through it, and keep it clean. The old town was considerably larger than the new, which at present consists of between 4 and 500 houses. Many of the streets are narrow and irregular: the buildings are of different materials; some of natural stone out of the quarries, some of a facitious or artificial stone, and a few of brick. The people are supplied with fresh provisions chiefly from the coast of Barbary, with fruit,

Gibbous
Gibraltar.

roots, and vegetables, of all sorts from thence, or from their own gardens. Besides what is properly called the town, there are several spacious and commodious public edifices erected; such as barracks for the soldiers, with apartments for their officers, magazines of different kinds, storehouses for provisions, &c. The inhabitants, exclusive of the British subjects dependent on the garrison, or who reside there from other motives, consist of some Spaniards, a few Portuguese, a considerable number of Genoese, and about as many Jews; making in the whole, according to Dr Campbell, between two and three thousand, without reckoning the garrison; though some make them much fewer. The town may be said to have two ports; the first lying to the north, and is proper only for small vessels; the other is very commodious for large vessels, and has a fine stone quay. The bay is very beautiful and capacious, being in breadth about five miles, and in depth eight or nine, with several small rivers running into it. It is very advantageous to the place. There is no ground to be found in the middle of it at an hundred fathoms depth, so that a Squadron may lie there in great safety; the breezes from it are very refreshing; and it contributes likewise to the subsistence of the inhabitants, by supplying them with plenty of fish.

The strait of Gibraltar, through which the ocean passes into the Mediterranean, thereby dividing Europe from Africa, runs from west to east about 13 leagues. In this strait there are three remarkable promontories or capes on the Spanish side, and as many opposite to them on the Barbary side. The first of these, on the side of Spain, is cape Trefalgar, opposite to which is cape Spartel; and in the neighbourhood of this stood the fortrefs of Tangier, once in the possession of the British. The next on the Spanish side is Tarifa; and over against it lies Malabata, near the town of Alcafar, where the straits are about five leagues broad. Lastly, Gibraltar, facing the mountain of Abyla, near the fortrefs and town of Ceuta, which make the eastern entry of the straits.

The fortrefs of Gibraltar was formerly thought to be impregnable; but, in 1704, it was proposed by the two English Admirals Sir John Leake and Sir George Rooke, and by Prince George of Hesse Darmstadt, to attempt the reduction of it. The fleet entered the bay on the 21st of July; the prince landed a body of troops on the Ithmus, between the bay and the Mediterranean; the fleet cannonaded the town from the bay; and a detachment of English seamen having debarked at Europa point, with some loss, carried the outworks. This made such an impression on the inhabitants and the garrison, that the governor (the Marquis de Salinas) capitulated; and the Prince of Hesse took possession of the place on the 24th of the same month, with the loss of less than 100 men. The Spaniards, extremely sensible of the loss they had sustained, immediately sent an army of 10,000 men, under the command of the Marquis le Villadarias, to besiege it; and at the same time the Count de Thoulouse, who commanded the French fleet in the Mediterranean, put to sea in order to co-operate with the Spaniards. This produced the battle of Malaga, August 13th 1704, in which the French were defeated; though Sir George Rooke was in no condition to prosecute his victory, on account of his want of ammuni-

tion. The siege, however, went on, and the place was so much pressed, that if Sir John Leake, who was sent to its relief, had arrived one day later, the place had been inevitably lost. Five hundred Spaniards had bound themselves by an oath, either to become masters of Gibraltar, or to perish in the attempt. They had accordingly concealed themselves in some of the caves, of which there are many in the southern part of the promontory. The mountain had also at that time many trees upon it, by which the Spaniards ascended, and which were on that account afterwards cut down by the garrison. The enterprize of the Spaniards, however, did not succeed; for, having attempted to scale the walls, they were all to a man destroyed. Marshal de Tessé then joined the Spanish army, with a considerable body of French troops, and the siege was continued for six months longer; when the French fleet being defeated by Sir John Leake*, they were forced to turn the siege into a blockade. The excellent conduct, however, of Sir John Leake, and the Prince of Hesse Darmstadt, obliged them at last to abandon the enterprize. On the conclusion of the war, the fortrefs of Gibraltar was ceded to Britain, but without any territory; and ever since the Spaniards have fortified lines on the Ithmus, to prevent any communication between the garrison and the country. They have ever since continued to behold it with a jealous eye, and have meditated several attempts against it. In 1727 they again besieged it in form with a great army: but having made very little progress during four months, which they consumed before it, a cessation of arms took place; and no further attempt has been made till the present year (1779.)

The possession of Gibraltar is of very great consequence to Britain. It not only gives us the command of the Straits, and their navigation: but affords refreshment and accommodation to our fleets in time of war, and to our merchantmen at all times; which, to a maritime power, is of very great advantage. From its situation, it divides both the kingdoms of France and Spain; that is, it hinders a ready communication by sea between the different parts of these kingdoms. This, of course, hinders the conjunction of the fleets and squadrons with each other, or at least renders it so difficult as to be a perpetual check upon these ambitious powers. It awes also the piratical states of Barbary, and in like manner the emperor of Morocco; inasmuch, that our commerce is more safe than that of any other European power, which gives us great advantages in point of freight. It is otherwise highly favourable to our trade in the Mediterranean and Levant. It procures us the respect of the Italian and other powers; who, though far distant from Britain, must consider this as an instance of her power to hurt or assist them. It also saves us the expence of squadrons and convoys, upon any disputes or disturbances that may happen among those powers, and which would otherwise be necessary for the protection of our navigation.

GIBSON (RICHARD), an English painter, commonly called the *Dwarf*, was originally page to a lady at Mortlake; who, observing that his genius led him to painting, had the generosity to get him instructed in the rudiments of that art. He devoted himself to Sir Lely's manner, and copied his pictures

* See Leake.

Gibson.

to admiration, especially his portraits: his paintings in water-colours were also esteemed. He was in great favour with Charles I. who made him his page of the back-stairs; and he had the honour to instruct in drawing queen Mary and queen Anne when they were princesses. He married one Mrs Anne Shepherd, who was also a dwarf; on which occasion king Charles I. honoured their marriage with his presence, and gave away the bride. Mr Waller wrote a poem on this occasion, intitled "The Marriage of the Dwarfs;" in which are these lines:

"Design or chance makes others wive,
 "But nature did this match contrive;
 "Eve might as well have Adam fled,
 "As he deny'd her little bed.
 "To him, for whom heav'n seem'd to frame
 "And measure out this only dame."

Mr Fenton, in his notes on this poem, observes that he had seen this couple painted by Sir Peter Lely; and that they were of an equal stature, each being three feet ten inches high. However, they had nine children, five of which arrived at maturity; these well proportioned, and of the usual standard of mankind. But what nature denied this couple in stature, she gave them in length of days: for Mr Gibson died in the 75th year of his age; and his wife, having survived him almost 20 years, died in 1709, aged 89.

GIBSON (Dr Edmund), bishop of London, was born in Westmoreland, in 1669. He applied himself early and vigorously to learning, and displayed his knowledge in several writings and translations, which recommended him to the patronage of archbishop Tenison. He was appointed domestic chaplain to his Grace; and we soon after find him rector of Lambeth, and archdeacon of Surry. Becoming thus a member of the convocation, he engaged in a controversy, which was carried on with great warmth by the members of both houses, and defended his patron's rights, as president, in eleven pamphlets; he then formed and completed his more comprehensive scheme of the legal duties and rights of the English clergy, which was at length published under the title of *Codex Juris Ecclesiastici Anglicani*, in folio. Archbishop Tenison dying in 1715, and Dr Wake bishop of Lincoln being made archbishop of Canterbury, Dr Gibson succeeded the latter in the see of Lincoln, and in 1720 was promoted to the bishoprick of London. He now not only governed his diocese with the most exact regularity, but by his greater care promoted the spiritual affairs of the Church of England colonies in the West-Indies. He was extremely jealous of the least of the privileges belonging to the church; and therefore, though he approved of the toleration of the Protestant Dissenters, he continually guarded against all the attempts made to procure a repeal of the corporation and test acts; in particular, his opposition to those licentious assemblies called *masquerades*, gave great umbrage at court, and effectually excluded him from all further favours. He spent the latter part of his life in writing and printing pastoral letters, visitation-charges, occasional sermons, and tracts against the prevailing immoralities of the age. His pastoral letters are justly esteemed as the most masterly productions against infidelity and enthusiasm. His most celebrated work, the *Codex*, has been already mentioned. His other publications are, 1. An edition of Drummond's

Poemata Middiana, and James V. of Scotland's *Cantilena Rustica*, with notes. 2. The *Chronicon Saxonum*, with a Latin translation, and notes. 3. *Reliquiae Spelmanianae*, the posthumous works of Sir Henry Spelman, relating to the laws and antiquities of England. 4. An edition of *Quintilian de Arte Oratoria*, with notes. 5. An English translation of Camden's *Britannia*, with additions, two volumes folio: and, 5. A number of small pieces, that have been collected together and printed in three volumes folio.—His intense application to study impaired his health; notwithstanding which, he attained the age of 79. He expired in September 1748, after an episcopate of near 33 years.

With regard to bishop Gibson's private life and character, he was in every respect a perfect economist. His abilities were so well adapted to discharge the duties of his sacred function, that, during the incapacity of archbishop Wake, the transaction of ecclesiastical affairs was committed to the bishop of London. He was a true friend to the established church and government, and as great an enemy to persecution. He was usually consulted by the most learned and exalted personages in church and state, and the greatest deference was paid to his judgment. He possessed the social virtues in an eminent degree; his beneficence was very extensive; and had such generosity, that he freely gave two thousand five hundred pounds, left him by Dr Crow, who was once his chaplain, to Crow's own relations, who were very poor.

GIFT, *Donum*, in law, is a conveyance which passeth either lands or goods; and is of a larger extent than a grant, being applied to things moveable and immoveable; yet as to things immoveable, when taken strictly, it is applicable only to lands and tenements given in tail; but *gift*, and *grant*, are too often confounded.

GIGG, GIGA, or JIGG; a gay, brisk, and sprightly composition; and yet in full measure, as well as the allemande, which is more serious.—Menage takes the word to arise from the Italian *giga*, a musical instrument mentioned by Dante.

GILAN, or GHILAN, a considerable province of Asia, in Persia, lying on the side of the Caspian sea, and to the S. W. of it. It is supposed to be the Hyrcania of the ancients. It is very agreeably situated, having the sea on one side, and high mountains on the other; and there is no entering in but through narrow passes, which may easily be defended. The sides of the mountains are covered with many sorts of fruit-trees, and in the highest parts of them there are deer, bears, wolves, leopards, and tigers; which last the Persians have a method of taming, and hunt with them as we do with dogs.—Gilan is one of the most fruitful provinces of all Persia; and produces abundance of silk, oil, wine, rice, and tobacco, besides excellent fruits. The inhabitants are brave, and of a better complexion than the other Indians, and the women are accounted extremely handsome. Resht is the capital town.

GILBERT, or GILBERD, (William), a physician, was born at Colchester, in the year 1540, the eldest son of the recorder of that borough. Having spent some time in both universities, he went abroad; and

Gibson
Gilbert.

and at his return settled in London, where he practised with considerable reputation. He became a member of the college of physicians, and physician in ordinary to Queen Elizabeth, who, we are told, gave him a pension to encourage him in his studies. From his epitaph it appears that he was also physician to King James I. He died in the year 1603, aged 63; and was buried in Trinity-church in Colchester, where a handsome monument was erected to his memory. His books, globes, instruments, and fossils, he bequeathed to the college of physicians, and his picture to the school-gallery at Oxford. He wrote, 1. *De magnetis, magneticisque corporibus, et de magno magnetis tellure, physiologia nova*; London 1600, folio. 2. *De mundo nostro sublimitari, philosophia nova*; Amsterdam 1651, 4to. He was also the inventor of two mathematical instruments for finding the latitude at sea without the help of sun, moon, or stars. A description of these instruments was afterwards published by Thomas Blondeville in his *Theoriques of the planets*.

GILBERT (Sir Humphrey), a brave officer, and skilful navigator, was born about the year 1539, in Devonshire, of an ancient and honourable family. Though a second son, he inherited a considerable fortune from his father. He was educated at Eaton, and afterwards at Oxford; where probably he did not continue long, as he hath escaped the industrious Anthony Wood. It seems he was intended to finish his studies in the Temple; but, being introduced at court by his aunt Mrs Catharine Ashley, then in the queen's service, he was diverted from the study of the law, and commenced soldier. Having distinguished himself in several military expeditions, particularly that to Newhaven in 1563, he was sent over to Ireland to assist in suppressing a rebellion; where, for his signal services, he was made commander in chief and governor of Munster, and knighted by the lord deputy, Sir Henry Sidney, on the first day of the year 1570. He returned soon after to England, where he married a rich heiress. Nevertheless, in 1572, he failed with a squadron of nine ships, to reinforce Colonel Morgan, who at that time meditated the recovery of Flushing.

Probably on his return to England he resumed his cosmographical studies, to which he was naturally inclined: for, in the year 1576, he published his book on the North-west passage to the East Indies; and as Martin Frobisher failed the same year, probably it was in consequence of this treatise. In 1578, he obtained from the queen a very ample patent, empowering him to discover and possess in North America any lands then unsettled. He sailed to Newfoundland, but soon returned to England without success: nevertheless, in 1583, he embarked a second time with five ships, the largest of which put back on account of a contagious distemper on board. Our general landed on Newfoundland on the third of August, and on the fifth took possession of the harbour of St John's. By virtue of his patent, he granted leases to several people; but, though none of them remained there at that time, they settled afterwards in consequence of these leases: so that Sir Humphrey deserves to be remembered as the real founder of our vast American empire. On the 20th of August, he put to sea again, on board a small sloop; which on the 29th foundered in a hard gale of wind. Thus perished Sir Humphrey Gilbert; a man

of quick parts, a brave soldier, a good mathematician, a skilful navigator, and of a very enterprising genius. We learn also, that he was remarkable for his eloquence, being much admired for his patriotic speeches both in the English and Irish parliaments. He wrote "A discourse to prove a passage by the north-west to Cathaja and the East Indies, printed Lond. 1576." This treatise, which is a masterly performance, is preserved in Hakluyt's collection of voyages, vol. iii. p. 11. The style is superior to most, if not to all, the writers of that age; and shews the author to have been a man of considerable reading. He mentions, at the close of this work, another treatise, on Navigation, which he intended to publish: it is probably lost.

GILBERTINES, a religious order founded in England by St Gilbert, in the reign of Henry I. The nuns followed the rule St Benedict, and the monks that of Augustin. There were many monasteries of this order in different parts of England.

GILCHRIST (Dr Ebenezer), an eminent Scots physician, was born at Dumfries in 1707. He began the study of medicine at Edinburgh, which he afterwards prosecuted at London and Paris. He obtained the degree of doctor of medicine from the university of Rheims; and in the year 1732, he returned to the place of his nativity, where he afterwards constantly resided, and continued the practice of medicine till his death.

It may with justice be said, that few physicians of the present century have exercised their profession in a manner more respectable or successful than Dr Gilchrist; and few have contributed more to the improvement of the healing art. Having engaged in business in an early period of life, his attention was wholly devoted to observation. Endowed by nature with a judgment acute and solid, with a genius active and inventive, he soon distinguished himself by departing, in various important particulars, from established but unsuccessful modes of practice. Several of the improvements which he introduced have procured him great and deserved reputation, both at home and abroad.

His practice, in ordinary cases, was allowed to be judicious, and placed him high in the confidence and esteem of the inhabitants of that part of the country where he lived. But his usefulness was not confined to his own neighbourhood. On many occasions he was consulted by letter from the most distant parts of the country.

In different collections are to be found several of his performances, which prove that he had something new and useful to offer upon every subject to which he applied himself. But those writings which do him the greatest honour, are two long dissertations on Nervous Fevers, in the Medical Essays and Observations published by a Society in Edinburgh; and a treatise on the use of Sea-voyages in medicine, which first made its appearance in the year 1757, and was afterwards re-printed in 1771. By means of the former, the attention of physicians was first turned to a species of fever which is now found to prevail universally in this country; and the liberal use of wine, which he was the first among the moderns to recommend, has since been adopted in these fevers by the most judicious physicians of the present age, and has probably contributed

Gild
Gilding

not a little to the success of their practice. His treatise on Sea-voyages points out in a manner so clear, and so much on the sure footing of experience, their utility in various distempers, particularly in consumptions, that there is now a prospect of our being able to employ a remedy in this untractable disease much more efficacious than any hitherto in use. Dr Gilchrist died in 1774.

GILD, or GUILD. See GUILD.

GILDAS (surnamed *the Wise*), was born in Wales, in the year 511. Where he was educated is uncertain; but it appears from his own writings that he was a monk. Some writers say that he went over to Ireland; others, that he visited France and Italy. They agree however in asserting, that after his return to England, he became a celebrated and most assiduous preacher of the gospel. Du Pin says he founded a monastery at Venetia in Britain. Gildas is the only British author of the sixth century, whose works are printed; they are therefore valuable on account of their antiquity, and as containing the only information we have concerning the times of which he wrote. His *History of Britain* is, however, a very stilly performance, and his style obscure and inelegant.

GILDING, the art of spreading or covering a thing over with gold, either in leaf or liquid. The art of gilding was not unknown among the ancients, though it never arrived among them at the perfection to which the moderns have carried it. Pliny assures us, that the first gilding seen at Rome, was after the destruction of Carthage, under the censorship of Lucius Mummius, when they began to gild the ceilings of their temples and palaces; the Capitol being the first place on which this enrichment was bestowed. But he adds, that luxury advanced on them so hastily, that in a little time you might see all, even private and poor persons, gild the very walls, vaults, &c. of their houses.

We need not doubt but they had the same method with us, of beating gold, and reducing it into leaves; though it should seem they did not carry it to the same height, if it be true which Pliny relates, that they only made 750 leaves of four fingers square out of a whole ounce. Indeed he adds, that they could make more; that the thickest were called *bractæ Prænestinae*, by reason of a statue of the goddess Fortune at Præneste gilt with such leaves; and that the thinner sort were called *bractæ quæstoriae*.

The modern gilders do also make use of gold-leaves of divers thicknesses; but there are some so fine, that a thousand do not weigh above four or five drachms. The thickest are used for gilding on iron, and other metals; and the thinnest, on wood. But we have another advantage over the ancients, in the manner of using or applying the gold: the secret of painting in oil, discovered of late ages, furnishes us with means of gilding works that shall endure all the injuries of time and weather, which to the ancients was impracticable. They had no way to lay the gold on bodies that would not endure the fire, but with whites of eggs, or size; neither of which will endure the water: so that they could only gild such places as were sheltered from the moisture of the weather.

The Greeks called the composition on which they applied their gilding on wood, *leucophæum* or *leucopho-*

rum; which is described as a sort of glutinous, compound earth, serving, in all probability, to make the gold stick, and bear polishing. But the particulars of this earth, its colour, ingredients, &c. the antiquaries and naturalists are not agreed upon.

The lustre and beauty of gold have occasioned several inquiries and discoveries concerning the different methods of applying it to different substances. Hence the art of gilding is very extensive, and contains many particular operations and various management.

A colour of gold is given by painting and by varnishes, without employing gold; but this is a false kind of gilding. Thus a very fine golden colour is given to brads and to silver, by applying upon these metals a gold-coloured varnish, which, being transparent, shews all the brilliancy of the metals beneath. Many ornaments of brads are varnished in this manner, which is called *gold lacquering*, to distinguish them from those which are really gilt. Silver-leaves thus varnished are put upon leather, which is then called *gilt leather*. See LACQUER.

Amongst the false gilding may also be reckoned those which are made with thin leaves of copper or brads, called *Dutch-leaf*. In this manner are made all the kinds of what is called *gilt paper*.

In the true gilding, gold is applied to the surface of bodies. The gold intended for this purpose ought in general to be beat into thin leaves, or otherwise divided into very fine parts.

As metals cannot adhere well merely by contact to any but to other metallic substances, when gold is to be applied to the surface of some unmetallic body, that surface must be previously covered with some gluey and tenacious substance, by which the gold shall be made to adhere. These substances are in general called *size*. Some of these are made of vegetable and animal glues, and others of oily, gluey, and drying matters. Upon them the leaves of gold are applied, and pressed down with a little cotton or a hare's foot; and when the whole is dry, the work is to be finished and polished with a hard instrument, called a *dogs-tooth*, to give lustre.

When the work is required to be capable of resisting rain or moisture, it ought to be previously covered with a composition of drying oil and yellow ochre ground together; otherwise a water-size may be used, which is prepared by boiling cuttings of parchment or white leather in water, and by mixing with this some chalk or whiting: several layers of this size must be laid upon the wood, and over these a layer of the same size mixed with yellow ochre. Lastly, another mixture, called *gold size*, is to be applied above these; upon which the gold-leaves are to be fixed. This gold size, the use of which is to make the gold-leaf capable of being burnished, is composed of tobacco-pipe clay, ground with some ruddle or black lead, and tempered with a little tallow or oil of olives. The edges of glasses may be gilt by applying, first, a very thin coat of varnish, upon which the gold-leaf is to be fixed; and when the varnish is hardened, may be burnished. This varnish is prepared by boiling powdered amber with linseed oil in a brads vessel to which a valve is fitted, and by diluting the above solution with four or five times its quantity of oil of turpentine; and that it may dry sooner, it may be ground with some white lead.

The

Gilding.

False gilding with lacquer or Dutch-leaf.

Gilding when first introduced at Rome.

Ancient gilding inferior to the modern.

Gilding.

6
Of gilding
metals.

The method of applying gold upon metals is entirely different. The surface of the metal to be gilt is first to be cleaned; and then leaves are to be applied to it, which, by means of rubbing with a polished blood-stone, and a certain degree of heat, are made to adhere perfectly well. In this manner silver-leaf is fixed and burnished upon brass in the making of what is called *French plate*, and sometimes also gold-leaf is burnished upon copper and upon iron.

Gold is applied to metals in several other manners. One of these is by previously forming the gold into a paste or amalgam with mercury. In order to obtain a small amalgam of gold and mercury, the gold is first to be reduced into thin plates or grains, which are heated red-hot, and thrown into mercury previously heated, till it begins to smoke. Upon stirring the mercury with an iron rod, the gold totally disappears. The proportion of mercury to gold is generally as six or eight to one.

With this amalgam the surface of the metal to be gilded is to be covered; then a sufficient heat is to be applied to evaporate the mercury; and the gold is lastly to be burnished with a blood-stone.

This method of gilding by amalgamation is chiefly used for gilding copper, or an alloy of copper, with a small portion of zinc, which more readily receives the amalgam; and is also preferable for its colour, which more resembles that of gold than the colour of copper. When the metal to be gilt is wrought or chased, it ought to be previously covered with quicksilver, before the amalgam is applied, that this may be easier spread: but when the surface of the metal is plain, the amalgam may be applied directly to it. The quicksilver or amalgam is made to adhere to the metal by means of a little aquafortis, which is rubbed on the metallic surface at the same time, by which this surface is cleaned from any rust or tarnish which might prevent the union or adhesion of the metals. But the use of the nitrous acid in this operation is not, as is generally supposed, confined merely to cleanse the surface of the metal to be gilt from any rust or tarnish it may have acquired; but it also greatly facilitates the application of the amalgam to the surface of that metal, probably in the following manner: It first dissolves part of the mercury of the amalgam; and when this solution is applied to the copper, this latter metal having a stronger disposition to unite with the nitrous acid than the mercury has, precipitates the mercury upon its surface, in the same manner as a polished piece of iron precipitates upon its surface copper, from a solution of blue vitriol. When the metal to be gilt is thus covered over with a thin precipitated coat of mercury, it readily receives the amalgam. In this solution and precipitation of mercury, the principal use of the nitrous acid in the process of gilding appears to consist. The amalgam being equally spread over the surface of the metal to be gilt, by means of a brush, the mercury is then to be evaporated by a heat just sufficient for that purpose; for if it be too great, part of the gold may also be expelled, and part of it will run together, and leave some of the surface of the metal bare: while the mercury is evaporating, the piece is to be, from time to time, taken from the fire, that it may be examined, that the amalgam may be spread more equally by means of a brush, that any defective parts of it may be again co-

7
Use of the
nitrous acid
in gilding.

vered, and that the heat may not be too suddenly applied to it: when the mercury is evaporated, which is known by the surface being entirely become of a dull yellow colour, the metal must then undergo other operations, by which the fine gold-colour is given to it. First, the gilded piece of metal is rubbed with a scratch-brush (which is a brush composed of brass wire) till its surface is made smooth; then it is covered over with a composition called *gilding wax*, and is again exposed to the fire till the wax be burnt off. This wax is composed of bees-wax, sometimes mixed with some of the following substances; red ochre, verdegriese, copper-scales, slum, vitriols, borax: but, according to Dr Lewis, the saline substances alone are sufficient, without any wax. By this operation the colour of the gilding is heightened; and this effect seems to be produced by a perfect distillation of some mercury remaining after the former operation. This distillation is well effected by this equable application of heat. The gilt surface is then covered over with a saline composition consisting of nitre, alum, or other vitriolic salt, ground together, and mixed up into a paste with water or urine. The piece of metal thus covered is exposed to a certain degree of heat, and then quenched in water. By this method its colour is further improved, and brought nearer to that of gold. This effect seems to be produced by the acid of nitre (which is disengaged by the vitriolic acid of the alum or other vitriolic salt during the exposure to heat) acting upon any particles of copper which may happen to lie on the gilded surface. Lastly, some artists think that they give an additional lustre to their gilt-work by dipping it in a liquor prepared by boiling some yellow materials, as sulphur, orpiment, or turmeric. The only advantage of this operation is, that a part of the yellow matter, as the sulphur, or turmeric, remains in some of the hollows of the carved work, in which the gilding is apt to be more imperfect, and to which it gives a rich and solid appearance.

Iron cannot be gilt by amalgamation, unless, as it is said, it be previously coated with copper by dipping in a solution of blue vitriol. Iron may also receive a golden coat from a saturated solution of gold in aqua-regia, mixed with spirit of wine, the iron having a greater affinity with the acid, from which it therefore precipitates the gold. Whether any of these two methods be applicable to use, is uncertain: but the method commonly employed of fixing gold upon iron is that above-mentioned, of burnishing gold-leaf upon this metal when heated so as to become blue; and the operation will be more perfect, if the surface has been previously scratched or grained.

Another method is mentioned by authors of gilding upon metals, and also upon earthen ware, and upon glass; which is, to fuse gold with regulus of antimony, to pulverize the mass which is sufficiently brittle to admit that operation, to spread this powder upon the piece to be gilt, and expose it to such a fire that the regulus may be evaporated, while the gold remains fixed. The inconveniences of this method, according to Dr Lewis, are, that the powder does not adhere to the piece, and cannot be equally spread; that part of the gold is dissipated along with the regulus; that glass is fusible with the heat necessary for the evaporation of regulus of antimony; and that copper

Gilding.

Gilding.

is liable to be corroded by the regulus, and to have its surface rendered uneven.

8
Improvements
by
Dr Lewis.

On the subject of gilding by amalgamation Dr Lewis has the following remarks. "There are two principal inconveniences in this business: One, that the workmen are exposed to the fumes of the mercury, and generally, sooner or later, have their health greatly impaired by them: the other, the loss of the mercury; for tho' part of it is said to be detained in cavities made in the chimney for that purpose, yet the greatest part of it is lost. From some trials I have made, it appeared that both these inconveniences, particularly the first and most considerable one, might in good measure be avoided, by means of a furnace of a due construction. If the communication of a furnace with its chimney, instead of being over the fire, is made under the grate, the ash-pit door or other apertures beneath the grate closed, and the mouth of the furnace left open; the current of air, which otherwise would have entered beneath, enters now at the top, and, passing down thro' the grate to the chimney, carries with it completely both the vapour of the fuel, and the fumes of such matters as are placed upon it: the back part of the furnace should be raised a little higher above the fire than the fore part, and an iron plate laid over it, that the air may enter only at the front, where the workman stands, who will be thus effectually secured from the fumes, and from being incommoded by the heat, and at the same time have full liberty of introducing, inspecting, and removing the work. If such a furnace is made of strong forged (not milled) iron plate, it will be sufficiently durable: the upper end of the chimney may reach above a foot and a half higher than the level of the fire: over this is to be placed a larger tube, leaving an interval of an inch or more all round between it and the chimney, and reaching to the height of 10 or 12 feet, the higher the better. The external air, passing up between the chimney and the outer pipe, prevents the latter from being much heated, so that the mercurial fumes will condense against its sides into running quicksilver, which, falling down to the bottom, is there catch'd in a hollow rim formed by turning inwards a portion of the lower part, and conveyed, by a pipe at one side, into a proper receiver.

"Mr Hellot communicates, in the Memoirs of the French Academy for the year 1745, a method of making raised figures of gold on works of gold or silver, found among the papers of Mr du Fay, and of which Mr du Fay himself had seen several trials. Fine gold in powder (such as results from the parting of gold and silver by aquafortis, is directed to be laid in a heap on a levigating stone, a cavity made in the middle of the heap, and half its weight of pure mercury put into the cavity: some of the fetid spirit, obtained from garlic root by distillation in a retort, is then to be added, and the whole immediately mingled and ground with a muller, till the mixture is reduced into an uniform grey powder. The powder is to be ground with lemon juice to the consistence of paint, and applied on the piece previously well cleaned and rubbed over with the same acid juice: the figures drawn with it may be raised to any degree by repeating the application. The piece is exposed to a gentle fire till the mercury is evaporated so as to leave the gold yellow, which is then to be pressed down, and rubbed with the finger and a

little band, which makes it appear solid and brilliant: after this it may be cut and embellished. The author observes, that being of a spongy texture, it is more advisable to cut it with a chisel than to raise it with a graver; that it has an imperfection of being always pale; and that it would be a desirable thing to find means of giving it colour, as by this method ornaments might be made of exquisite beauty and with great facility. As the paleness appears to proceed from a part of the mercury retained by the gold, I apprehend it might be remedied by the prudent application of a little warm aquafortis, which, dissolving the mercury from the exterior part, would give at least a superficial high colour: if the piece is silver, it must be defended from the aquafortis by covering it with wax. Instruments or ornaments of gold, stained by mercury, where the gold is connected with subtilances incapable of bearing fire, may be restored to their colour by the same means.

"The foregoing process is given entirely on the authority of the French writer. I have had no experience of it myself, but have seen very elegant figures of gold raised upon silver, on the same principle, by a different procedure. Some cinnabar was ground, not with the distilled spirit, but with the expressed juice of garlic, a fluid remarkably tenacious. This mixture was spread all over the polished silver; and when the first layer was dry, a second, and after this a third was applied. Over these were spread as many layers of another mixture, composed chiefly of asphaltum and linseed oil boiled down to a due consistence. The whole being dried, with a gentle heat, on a kind of wire-grate, the figures were traced and cut down to the silver so as to make its surface rough: the incisions were filled with an amalgam of gold, raised to different heights in different parts according to the nature of the design; after which a gentle fire, at the same time that it evaporated the mercury, destroyed the tenacity of the gummy juice, so that the coating, which served to confine the amalgam, and as a guide in the application of it, was now easily got off. The gold was then pressed down and embellished as in the former method; and had this advantage, that the surface of the silver under it having been made rough, it adhered more firmly, so as not to be in danger of coming off, as M. du Fay says the gold applied in his way sometimes did. The artist, however, found the process so troublesome, that though he purchased the receipt for a considerable sum, he has laid the practice aside."

Finally, some metals, particularly silver, may be gilt in the following manner:

Let gold be dissolved in aqua-regia. In this solution pieces of linen are to be dipt, and burnt to black ashes. These ashes being rubbed on the surface of the silver by means of a wet linen rag, apply the particles of gold which they contain, and which by this method adhere very well. The remaining part of the ashes is to be washed off; and the surface of the silver, which in this state does not seem to be gilt, is to be burnished with a blood-stone, till it acquire a fine colour of gold. This method of gilding is very easy, and consumes a very small quantity of gold. Most gilt ornaments upon fans, snuff-boxes, and other toys of much show and little value, are nothing but silver gilt in this manner.

9
Mr Du
Fay's me-
thod of rais-
ing gold
figures.

Gilding.

10
Another
method.

11
Easy me-
thod of
gilding sil-
ver.

Gill
Gilpin.

12
Methods
of gilding
glass.

Gold may also be applied to glass, porcelain, and other vitrified matters. As the surface of these matters is very smooth, and consequently is capable of a very perfect contact with gold leaves, these leaves adhere to them with some force, although they are not of metallic nature. This gilding is so much more perfect, as the gold is more exactly applied to the surface of the glass. The pieces are then to be exposed to a certain degree of heat, and burnished slightly to give them lustre.

A more substantial gilding is fixed upon glass, enamel, and porcelain, by applying to these substances powder of gold mixed with a solution of gum arabic, or with some essential oil, and a small quantity of borax; after which a sufficient heat is to be applied to soften the glass and the gold, which is then to be burnished. With this mixture any figures may be drawn. The powders for this purpose may be made, 1. By grinding gold-leaf with honey, which is afterwards to be washed away with water. 2. By distilling to dryness a solution of gold in aqua-regia. 3. By evaporating the mercury from an amalgam of gold, taking care to stir well the mass near the end of the process. 4. By precipitating gold from its solution in aqua-regia by applying to it a solution of green vitriol in water, or some copper, and perhaps some other metallic substances.

GILL, a measure of capacity, containing a quarter of an English pint.

GILLS, in ichthyology. See BRANCHIÆ.

GILOLO, a large island of the pacific ocean, lying between 1° S. Lat. and 2° N. Lat. and between 125° and 128° E. Long. It belongs to the Dutch; but does not produce any of the fine spices, tho' it lies in the neighbourhood of the spice-islands. The natives are fierce and cruel savages.

GILPIN (Bernard), rector of Houghton, distinguished by his extraordinary piety and hospitality, was descended from an ancient and honourable family in Westmoreland, and born in 1517. As he was bred in the Catholic religion, so he for some time defended it against the reformers, and at Oxford held a disputation with Hooper afterward bishop of Worcester and martyr for the Protestant faith; but was staggered in another disputation with Peter Martyr, and began seriously to examine the contested points by the best authorities. Thus, being presented to the vicarage of Norton in the diocese of Durham, he soon resigned it, and went abroad to consult eminent professors on both sides; and after three years absence returned a little before the death of queen Mary, satisfied in the general doctrines of the reformation. He was kindly received by his uncle Dr Tontall, bishop of Durham; who soon after gave him the archdeaconry of Durham, to which the rectory of Essington was annexed. When repairing to his parish, tho' the persecution was then at its height, he boldly preached against the vices, errors, and corruptions of the times, especially in the clergy, on which a charge consisting of 13 articles was drawn up against him, and presented in form to the bishop. But Dr Tontall found a method of dismissing the cause in such a manner as to protect his nephew, without endangering himself, and soon after presented him to the rich living of Houghton le Spring. He was a second time accused to the bishop, and again protected; when his

enemies, enraged at this second defeat, laid their complaint before Dr Bonner, bishop of London; who immediately gave orders to apprehend him. Upon which Mr Gilpin bravely prepared for martyrdom; and ordering his house-steward to provide him a long garment, that he might make a decent appearance at the stake, set out for London. Luckily, however, he broke his leg on the journey; which protracted his arrival until the news of the queen's death freed him from all further apprehensions. Being immediately set at liberty, he returned to Houghton, where he was received by his parishioners with the sincerest joy.

Upon the deprivation of the Popish bishops, he was offered the see of Carlisle, which he declined; and confining his attention to his rectory, discharged all the duties of his function in the most exemplary manner. To the greatest humanity and courtesy, he added an unwearied application to the instruction of those under his care. He was not satisfied with the advice he gave in public, but used to instruct in private; and brought his parishioners to come to him with their doubts and difficulties. He had a most engaging manner towards those whom he thought well-disposed: nay, his very reproof was so conducted, that it seldom gave offence; the becoming gentleness with which it was urged, made it always appear the effect of friendship. Thus, with unceasing assiduity, did he employ himself in admonishing the vicious, and encouraging the well-intentioned; by which means, in a few years, he made a greater change in his neighbourhood, than could well have been imagined. A remarkable instance, what reformation a single man may effect, when he hath it earnestly at heart!

But his hopes were not so much in the present generation, as in the succeeding. It was an easier task, he found, to prevent vice, than to correct it; to form the young to virtue, than to amend the bad habits of the old. He employed much of his time, therefore, in endeavouring to improve the minds of the younger part of his parish; suffering none to grow up in ignorance of their duty; but pressing it as the wisest part to mix religion with their labour, and amidst the cares of this life to have a constant eye upon the next. He attended to every thing which might be of service to his parishioners. He was very assiduous in preventing all law-suits among them. His hall is said to have been often thronged with people, who came to him about their differences. He was not indeed much acquainted with law; but he could decide equitably, and that satisfied; nor could his sovereign's commifion have given him more weight, than his own character gave him.

His hospitable manner of living was the admiration of the whole country. He spent in his family every fortnight 40 bushels of corn, 20 bushels of malt, and a whole ox; besides a proportionable quantity of other kinds of provision. Strangers and travellers found a cheerful reception. All were welcome that came; and even their beasts had so much care taken of them, that it was humorously said, "If a horse was turned loose in any part of the country, it would immediately make its way to the rector of Houghton's."

Every Sunday, from Michaelmas till Easter, was a sort of public day with him. During this season he expected to see all his parishioners and their families.

For

Gilpin.

For their reception, he had three tables well covered: the first was for gentlemen, the second for husbandmen and farmers, and the third for day-labourers. This piece of hospitality he never omitted, even when losses, or a scarcity of provision, made its continuance rather difficult to him. He thought it his duty, and that was a deciding motive. Even when he was absent from home, no alteration was made in his family-expenditures: the poor were fed as usual, and his neighbours entertained.

But notwithstanding all this painful industry, and the large scope it had in so extended a parish, Mr Gilpin thought the sphere of his benevolence yet too confined. It grieved him extremely, to see every where in the parishes around him, so great a degree of ignorance and superstition, occasioned by the shameful neglect of the pastoral care in the clergy of those parts. These bad consequences induced him to supply, as far as he could, what was wanting in others. For this purpose, every year he used regularly to visit the most neglected parishes in Northumberland, Yorkshire, Cheshire, Westmoreland, and Cumberland; and that his own parish in the mean time might not suffer, he was at the expence of a constant assistant. In each place he stayed two or three days; and his method was, to call the people about him, and lay before them, in as plain a way as possible, the danger of leading wicked, or even careless lives; explaining to them the nature of true religion; instructing them in the duties they owed to God, their neighbour, and themselves; and shewing them how greatly a moral and religious conduct would contribute to their present as well as future happiness.

As Mr Gilpin had all the warmth of an enthusiast, though under the direction of a very calm and sober judgment, he never wanted an audience, even in the wildest parts; where he roused many to a sense of religion, who had contracted the most inveterate habits of inattention to every thing of a serious nature. And wherever he came, he used to visit all the gaols and places of confinement; few in the kingdom having at that time any appointed minister. And by his labours, and affectionate manner of behaving, he is said to have reformed many very abandoned persons in those places. He would employ his interest likewise for such criminals whose cases he thought attended with any hard circumstances, and often procured pardons for them.

There is a tract of country upon the border of Northumberland, called *Redf-dale* and *Time-dale*, of all barbarous places in the north, at that time the most barbarous. Before the Union, this place was called the *debateable land*, as subject by turns to England and Scotland, and the common theatre where the two nations were continually acting their bloody scenes. It was inhabited by a kind of desperate banditti, rendered fierce and active by constant alarms: they lived by theft, used to plunder on both sides of the barrier; and what they plundered on one, they exposed to sale on the other; by that means escaping justice. And in this dreadful country, where no man would even travel that could help it, Mr Gilpin never failed to spend some part of every year.

He generally chose the Christmas holidays for his journey, because he found the people at that season

most disengaged, and most easily assembled. He had set places for preaching, which were as regularly attended as the assize-towns of a circuit. If he came where there was a church, he made use of it: if not, of barns, or any other large building; where great crowds of people were sure to attend him, some for his instructions, and others for his charity.—This was a very difficult and laborious employment. The country was so poor, that what provision he could get, extreme hunger only could make palatable. The inclemency of the weather, and the badness of the roads through a mountainous country, and at that season covered with snow, exposed him likewise often to great hardships. Sometimes he was overtaken by the night, the country being in many places desolate for several miles together, and obliged to lodge out in the cold. At such times, we are told, he would make his servant ride about with his horses, whilst himself on foot used as much exercise as his age and the fatigues of the preceding day would permit. All this he cheerfully underwent; esteeming such services well compensated by the advantages which he hoped might accrue from them to his uninstructed fellow-creatures.

The disinterested pains he took among these barbarous people, and the good offices he was always ready to do them, drew from them the warmest and sincerest expressions of gratitude. Indeed, he was little less than adored among them, and might have brought the whole country almost to what he pleased. One instance that is related, shews how greatly he was revered. By the carelessness of his servant, his horses were one day stolen. The news was quickly propagated, and every one expressed the highest indignation at the fact. The thief was rejoicing over his prize, when, by the report of the country, he found whose horses he had taken. Terrified at what he had done, he instantly came trembling back, confessed the fact, returned the horses, and declared he believed the devil would have seized him directly, had he carried them off, knowing them to have been Mr Gilpin's.

We have already taken notice of Mr Gilpin's uncommonly generous and hospitable manner of living. The value of his rectory was about 400*l.* a year: an income, indeed, at that time very considerable, but yet in appearance very unproportionate to the generous things he did: indeed, he could not have done them, unless his frugality had been equal to his generosity. His friends, therefore, could not but wonder to find him, amidst his many great and continual expences, entertain the design of building and endowing a grammar-school: a design, however, which his exact economy soon enabled him to accomplish, though the expence of it amounted to upwards of 500*l.* His school was no sooner opened, than it began to flourish; and there was so great a resort of young people to it, that in a little time the town was not able to accommodate them. He put himself, therefore, to the inconvenience of sitting up a part of his own house for that purpose, where he seldom had fewer than twenty or thirty children. Some of these were the sons of persons of distinction, whom he boarded at easy rates: but the greater part were poor children, whom he not only educated, but clothed and maintained: he was at the expence likewise of boarding in the town many other poor children. He used to bring several every

year from the different parts where he preached, particularly Readf-dale and Tine-dale; which places he was at great pains in civilizing, and contributed not a little towards rooting out that barbarism which every year prevailed less among them.

As to his school, he not only placed able masters in it, whom he procured from Oxford, but himself likewise constantly inspected it. And, that encouragement might quicken the application of his boys, he always took particular notice of the most forward: he would call them *his own scholars*, and would send for them often into his study, and there instruct them himself. One method used by him to fill his school, was a little singular. Whenever he met a poor boy upon the road, he would make trial of his capacity by a few questions; and if he found it such as pleased him, he would provide for his education. And besides those whom he sent from his own school to the universities, and there wholly maintained, he would likewise give to others, who were in circumstances to do something for themselves, what farther assistance they needed. By which means he induced many parents to allow their children a liberal education, who otherwise would not have done it. And Mr Gilpin did not think it enough to afford the means only of an academical education to these young people, but endeavoured to make it as beneficial to them as he could. He still considered himself as their proper guardian; and seemed to think himself bound to the public for their being made useful members of it, as far as it lay in his power to make them so. With this view he held a punctual correspondence with their tutors; and made the youths themselves frequently write to him, and give him an account of their studies. So solicitous indeed was he about them, knowing the many temptations to which their age and situation exposed them, that once every other year he generally made a journey to the universities, to inspect their behaviour. And this uncommon care was not unrewarded; for many of his scholars became ornaments to the church, and exemplary instances of piety.

To the account that hath been already given of Mr Gilpin's hospitality and benevolence, the following particulars may be added. Every Thursday throughout the year, a very large quantity of meat was dressed wholly for the poor; and every day they had what quantity of broth they wanted. Twenty-four of the poorest were his constant pensioners. Four times in the year a dinner was provided for them; when they received from his steward a certain quantity of corn, and a sum of money; and at Christmas they had always an ox divided among them.

Wherever he heard of any in distress, whether of his own parish, or any other, he was sure to relieve them. In his walks abroad, he would frequently bring home with him poor people, and send them away clothed as well as fed. He took great pains to inform himself of the circumstances of his neighbours, that the modesty of the sufferer might not prevent his relief. But the money best laid out was, in his opinion, that which encouraged industry. It was one of his greatest pleasures to make up the losses of his laborious neighbours, and prevent their sinking under them. If a poor man had lost a beast, he would lend him another in his room: or if any farmer had had a

bad year, he would make him an abatement in his tythes.—Thus, as far as he was able, he took the misfortunes of his parish upon himself; and, like a true shepherd, exposed himself for his flock. But of all kinds of industrious poor, he was most forward to assist those who had large families: such never failed to meet with his bounty, when they wanted to settle their children in the world.

In the distant parishes where he preached, as well as in his own neighbourhood, his generosity and benevolence were continually shewing themselves; particularly in the desolate parts of Northumberland. "When he began his journey," says an old manuscript life of him, "he would have ten pounds in his purse; and, at his coming home, he would be twenty nobles in debt, which he would always pay within a fortnight after."—In the gaols he visited, he was not only careful to give the prisoners proper instructions, but used to purchase for them likewise what necessaries they wanted.

Even upon the public road, he never let slip an opportunity of doing good. He has often been known to take off his cloak, and give it to an half-naked traveller: and when he has had scarce money enough in his pocket to provide himself a dinner, yet would he give away part of that little, or the whole, if he found any who seemed to stand in need of it.—Of this benevolent temper, the following instance is preserved. One day returning home, he saw in a field several people crowding together; and judging something more than ordinary had happened, he rode up, and found that one of the horses in a team had suddenly dropped down, which they were endeavouring to raise; but in vain, for the horse was dead. The owner of it seemed much dejected with his misfortune; and declaring how grievous a loss it would be to him, Mr Gilpin bade him not be disheartened: "I'll let you have, (says he) 'honest man, that horse of mine,' and pointed to his servant's.—"Ah! master, (replied the countryman) my pocket will not reach such a beast as that." "Come, come, (said Mr Gilpin) take him, take him; and when I demand my money, then thou shalt pay me."

This worthy and excellent divine, who merited and obtained the glorious titles of the *Father of the Poor*, and the *Apostle of the North*, died in 1583, in the 66th year of his age.

GILTHEAD, in ichthyology. See SPARUS.

GIN. See GENEVA.

GIN, in mechanics, a machine for driving piles, fitted with a windlass and winches at each end, where eight or nine men heave, and round which a rope is reeved that goes over the wheel at the top: one end of this rope is seized to an iron-monkey, that hooks to a bettie of different weights, according to the pile they are to drive, being from eight to thirteen hundred weight; and when hove up to a cross-piece, near the wheel, it unhooks the monkey, and lets the beetle fall on the upper end of the pile, and forces the same into the ground: then the monkey's own weight overhauls the windlafs, in order for its being hooked again to the beetle.

GINKGO, the MAIDEN-HAIR TREE, is a native of Japan, where it is also known by the names of *Ginan* and *Iiso*. It rises with a long, erect, thick and branched

Ginkgo
Giorgione.

branched stem, to the size of a walnut-tree. The bark is ash-coloured, the wood brittle and smooth, the pith soft and fungous. The leaves are large, expanded from a narrow bottom into the figure of a maiden-hair leaf, unequally parted, streaked, without fibres or nerves; both surfaces having the same appearance, and supported upon footstalks, which are compressed upon the upper surface, and extended into the substance of the leaf. From the uppermost shoots hang the flowers in long catkins that are filled with the fertilizing powder; and to which succeeds the fruit, adhering to a thick fleshy pedicle, which proceeds from the bottom of the leaves. This fruit is either exactly or nearly round, and of the appearance and size of a damask plum. The substance surrounding the fruit is fleshy, juicy, white, very harsh, and adheres so firmly to the inclosed nut, as not to be separated from it, except by putrefaction. The nut, properly termed *Gineau*, resembles the pistachia nut, especially a Persian species named *bergies pistai*; but is almost double in size, and of the figure of an apricot stone. The shell is somewhat white, woolly, and brittle; and incloses a white loose kernel, having the sweetness of an almond, along with a degree of harshness. These kernels taken after dinner are said to promote digestion, and to give relief in furberis; whence they never fail to make part of the dessert in great feasts and anniversary entertainments.—Many of these plants have been reared by Mr James Gordon at his nursery near Mile-end. They seem to be very hardy, and thrive in this country in the open air.

GINGER, the root of a species of amomum. See AMOMUM.

GINGIVÆ, the gums. See GUMS.

INGLYMUS, in anatomy. See ANATOMY, n^o 2, d.

GINSENG. See PANAX.

GIOIA (Flavio), of Amalfi, in the kingdom of Naples, the celebrated mathematician; who, from his knowledge of the magnetic powers, invented the mariner's compass, by which the navigation of the Europeans was extended to the most distant regions of the globe: before this invention, navigation was confined to coasting. The king of Naples being a younger branch of the royal family of France, he marked the north point with a fleur de lis, in compliment to that country. It is said the Chinese knew the compass long before; be this as it may, the Europeans are indebted to Gioia for this invaluable discovery. He flourished A.D. 300.

GIRAFFE, in zoology. See CERVUS.

GIRALD (Barry), or *Giraldus Cambrensis*. See BARRY.

GIORGIONE, so called from his comely aspect, was an illustrious Venetian painter, born in 1478. He received his first instructions from Giovanni Bellini; but studying afterwards the works of Leonardo da Vinci, he soon surpassed them both, being the first among the Lombards who found out the admirable effects of strong lights and shadows. Titian became his rival in this art; and was so careful in copying the life, that he excelled Giorgione in discovering the delicacies of nature, by tempering the boldness of his colouring. The most valuable piece of Giorgione in oil is that of Christ carrying his cross, now in the

church of San Rovo in Venice; where it is held in great veneration. He died of the plague young, in 1511.

GIOSEPPINO, an eminent painter, so called by way of contraction from *Gioseppe d'Arpino*, the town of Naples, where he was born in 1560. Being carried to Rome very young, and employed by painters then at work in the Vatican to grind their colours, he soon made himself master of the elements of design, and by degrees grew very famous. His wit and humour gained him the favour of popes and cardinals, who found him business in plenty. Gregory XIII. shewed him great respect; and Lewis XIII. of France made him a knight of the order of St Michael. By the force of a happy genius he acquired a light and agreeable manner of delineating; though it is remarked by De Piles, that he degenerated into a style which neither partook of true nature, nor of the antique. His battles in the capitol are the most esteemed of all his pieces. He died at Rome in 1640.

GIOTTO, an ingenious painter, sculptor, and architect of Florence, born in 1276. He was the disciple of Cimabue; but far superior to his master in the air of his heads, the attitude of his figures, and in the tone of his colouring; but could not express liveliness in the eyes, tenderness in the flesh, or strength in the muscles of his naked figures. He was principally admired for his works in mosaic; the best of which is over the grand entrance of St Peter's church at Rome. The observation of Alberti on that piece is, that in the ship of Giotto, the expression of fright and amazement of the disciples at seeing St Peter walk upon the water is so excellent, that each of them exhibits some characteristic sign of his terror. His death happened in 1336, and the city of Florence honoured his memory with a statue of marble over his tomb.

GIRALDI (Lilio Gregorio), an ingenious critic, and one of the most learned men that modern Italy has produced, was born at Ferrara in 1479. He was at Rome when it was plundered by the emperor Charles V.; and having thus lost all he had, and being tormented by the gout, he struggled through life with ill fortune and ill health. He wrote, nevertheless, 17 performances, which were collected and published at Basil in 2 vols folio in 1580, and at Leyden in 1696. Authors of the first rank have bestowed the highest eulogies on Giraldus; particularly Casaubon and Thuanus.

GIRALDI (John Baptist Cintio), an Italian poet of the same family with the foregoing Lilio, was born in 1504. He was secretary to the duke of Ferrara, and afterwards became professor of rhetoric at Pavia. He died in 1573. His works, which consist chiefly of tragedies, were collected and published at Venice by his son Celfo Giraldi, in 1583; and some scruple not to rank him among the best tragic writers Italy has produced.

GIRARDON (Francis), a celebrated French architect and sculptor, born at Troyes, in 1627. Lewis XIV. being informed of his great talents, sent him to Rome with a pension of 1000 crowns. At his return into France, he laboured for the royal palaces, and the gardens of Versailles and Trianon; where there are many of his works executed in bronze and in marble, from the designs of Charles le Brun. The mausoleum

Giosepchino
Giraldon.

Gironne
Gladiators.

of cardinal de Richlieu, in the Sorbonne, and the equestrian statue of Lewis XIV. at the Place de Vendôme, where the statue and horse are cast in one piece, pass for his most excellent performances. Girardon was professor, rector, and chancellor, of the Academy of Painting and Sculpture; and had the post of inspector-general of all the works done in sculpture. He died in 1715.

GIIRONNE, or GIRONNY, in heraldry, a coat of arms divided into girones, or triangular figures, meeting in the centre of the shield, and alternately colour and metal.

GITTITH, a Hebrew word occurring frequently in the Psalms, and generally translated *wine-presser*. The conjectures of interpreters are various concerning this word. Some think it signifies a sort of musical instrument; others, that the psalms with this title were sung after the vintage; lastly, others, that the hymns of this kind were invented in the city of Gath. Calmet is rather of opinion, that it was given to the class of young women or songstresses of Gath to be sung by them; Psal. viii. 1. lxxxi. 1. lxxiv. 1. Dr Hammond thinks that the psalms with this title were all set to the same tune, and made on Goliath the Gittite.

GIULA, a strong town of Upper Hungary, on the frontiers of Transylvania. It was taken by the Turks in 1566, and retaken by the Imperialists in 1695. It is seated on the river Kereszban, in E. Long. 21. 1. N. Lat. 46. 25.

GIUSTANDEL, a large and strong town of Turkey in Europe, and in Macedonia, with a Greek archbishop's see. It is seated near the lake Ochrida, in E. Long. 20. 50. N. Lat. 41. 10.

GLACIES MARIE. See *Lapis Specularis*.

GLACIS, in building, an easy insensible slope or declivity.

The descent of the glacis is less steep than that of the talus. In gardening, a descent sometimes begins in talus, and ends in glacis.

The glacis of the cornice, is an easy imperceptible slope in the cymatium, to promote the descent and draining off the rain-water.

GLACIS, in fortification, that mass of earth which serves as a parapet to the covered way, sloping easily towards the campaign or field.

GLADE, in gardening and agriculture, an opening and light passage made through a wood, by lopping off the branches of trees along that way.

GLADIATORS, in antiquity, persons who fought, generally in the arena at Rome, for the entertainment of the people.

The gladiators were usually slaves, and fought out of necessity; though sometimes freemen made profession thereof, like our prize-fighters, for a livelihood. The Romans borrowed this cruel diversion from the Asiatics; and we find that even the high-priests had their ludi pontificales, and ludi sacerdotales. As from the earliest ages of antiquity we read that it was customary to sacrifice prisoners of war to the manes of the great men that fell in the engagement, in process of time they came to sacrifice slaves at the funerals of all persons of condition; but as it would have appeared barbarous to cut their throats like beasts, they were appointed to fight with each other, and to do their best to save their own lives by killing their adversary.

Hence arose the masters of arms called *laniffæ*, and men learned to fight. These laniffæ bought slaves to train up to this cruel trade, whom they afterwards sold to such as had occasion to exhibit shews. Junius Brutus, who expelled the kings, was the first that honoured the funeral of his father with these inhuman diversions at the sepulchre of the deceased: but afterwards they were removed to the circus and amphitheatres; and other persons, besides slaves, would hire themselves to this infamous office.

They were all first sworn that they would fight till death; and if they failed, they were put to death, either by fire, swords, clubs, whips, &c. It was usual with the people, or emperor, to grant them life when they shewed no signs of fear. Augustus decreed that it should always be granted them.

From slaves and freed-men, the wanton sport spread to persons of rank, as we find in Nero's time. And Domitian exhibited combats of women in the night-time. We also read, that dwarfs encountered with one another. Constantine the Great first prohibited these combats in the East; but the practice was not entirely abolished in the West before Theodoric king of the Ostrogoths in the year 500.

When any person designed to entertain the people with a show of gladiators, he set up bills in the public places, giving an account of the time, the number and names of the combatants, and the circumstances whereby they were to be distinguished; each having his several badge, which generally was a peacock's feather: they also gave notice what time the show would last; and sometimes gave representations of these things in painting, as is practised among us by those who have any thing to show at fairs, &c.

Upon the day appointed for the show, in the first place the gladiators were brought out all together, and obliged to take a circuit round the arena in a very solemn and pompous manner. After this they proceeded *paria componere*, to match them by pairs, in which great care was taken to make the matches equal. The first sort of weapons they made use of were slaves, or wooden foils called *rudes*; and the second were effective weapons, as swords, poinards, &c.

The first were called *arma luforia*, or *exercitoria*; the second, *decretoria*, as being given by decree or sentence of the prætor, or of him at whose expence the spectacle was exhibited.

They began to fence or skirmish with the first, which was to be the prelude to the battle; and from thence, when well warmed, they advanced to the second, with which they fought naked. The first part of the engagement was called *ventilare*, *preludare*; and the second *dimicare ad certum*, or *versus armis pugnare*.

When any received a remarkable wound, either his adversary or the people used to cry out, *Habet, Hoc habet*. If the vanquished surrendered his arms, it was not in the victor's power to grant him life: it was the people during the time of the republic, and the prince or people during the time of the empire, that were alone empowered to grant this boon. The two signs of favour and dislike given by the people were, *premere pollicem*, and *vertere pollicem*; the former of which M. Dacier takes to be a clenching of the fingers of both hands between one another, and so holding the two thumbs upright close together, was a sign of

of the people's admiration of the courage shewn by both combatants; and at the same time for the conqueror to spare his antagonist's life: but the contrary motion, or bending back of the thumbs, signified the dissatisfaction of the spectators, and authorised the victor to kill the other combatant downright for a coward. The emperor saved whom he liked, if he was present at the solemnity, in the same manner.

After the engagement, several marks of favour were conferred on the victor, particularly a branch of palm-tree; and oftentimes a sum of money, perhaps gathered up among the spectators: but the most common rewards were the pileus and the rudis. The former was given only to such gladiators as were slaves, for a token of obtaining their freedom. But the rudis seems to have been bestowed both on slaves and freemen; with this difference, that it procured the former no more than a discharge from any further performance in public, upon which they commonly turned lanista: but the rudis, when given to such persons as, being free, had hired themselves out for these shows, restored them to a full enjoyment of their liberty. See PILEUS, RUDIS, and LANISTA.

GLADIOLUS, CORN-FLAG; a genus of the monogynia order, belonging to the pentandria class of plants. There are ten species, of which the most remarkable is the communis, or common gladiolus. This hath a round, compressed, tuberous root; long sword-shaped leaves; an erect flower-stalk, two or three feet high; the top garnished with several pretty large flowers of a red or white colour, having each six petals. They appear in May and June, and are succeeded by plenty of seed in August. The plants are very hardy, and will thrive in any soil or situation. They are propagated by offsets from the roots.

GLAMORGANSHIRE, by the Welsh called *Gwalad Morganwg* or *Vorganwg*, i. e. the county of *Morganwg*; a county of South Wales, bounded on the south by the Severn sea, on the north by Brecknockshire, on the east by Monmouthshire, and on the west by Caermarthenshire. It extends in length 48 miles, in breadth 27; and in circumference about 116. On the north side, where there are mountains covered with snow a great part of the year, the air is sharp, and the soil very indifferent; but, on the south side, as the country approaches nearer to a level, the soil grows better, producing plenty both of corn and groats. Its commodities are black cattle, sheep, coals, lead, fish, and butter. The chief rivers of this country are the Rhymney or Renny, the Taff, the Ogmore, the Avon, the Cleddagh, and the Tavye. This country was formerly full of castles, most of which are now fallen to decay. It hath many small harbours on the coast for exporting coals and provisions. Of the former it sends large quantities both to England and Ireland; but of the latter, to England almost solely, especially butter. It sends two members to parliament, one for the shire, and one for the borough of Cardiff the capital.

GLAND, in anatomy, may be defined a circumscribed apparatus of the soft parts, whose office is to secrete a certain juice, and throw it out of the immediate circulation.

The glands are roundish bodies, seated in the cellular membrane, generally near the large vessels; their

substance is firm, and of various colours. Sylvius was the first who divided the glands into conglobate and conglomerate. Malpighi added what he calls the folliculus or simple gland; instances of which are the small glands behind the ears, but the most remarkable are those in the fauces.

Dr Nicholls divides the glands into sinuous, tubular, and equal. What he means by *sinuous* gland is, when each little gland hath its own excretory duct, through which it transmits its liquor to a common basin, as the kidneys; his *tubular* is the same as the conglobate gland of Sylvius, of which the testes are an instance. By an *equal* gland he means where the vessels are branched, as in the liver.

Ruych proves by subtle injections, that the substance of the glands is vascular, consisting of a ramifying artery, partly terminating in a vein, and partly in an excretory duct.

Mr Hewson says, that the little corpora globosa, which most modern anatomists call cryptæ and folliculæ, are nothing but convoluted arteries.

The glands are often disordered by becoming large and indurated. When they are swelled and hard, they are said to be *indurated*; if they grow harder, they are said to be *scirrhus*: if, when hard, they become painful, they are *incipient* or *ocult* cancers; if their hardness and pain continue long, they are called *carcinomata*, or *inveterate ocult* cancers; and if the skin breaks, they are called *ulcerated* cancers *.

GLANDERS. See FARRIERY, § xii.

GLANDORP (Matthias), a learned physician, born in 1595, at Cologne, in which town his father was a surgeon. After receiving a doctor's degree at Padua, and visiting the principal towns of Italy, he settled at Bremen in 1618, where he practised physic and surgery with so much success, that he was made physician to the republic, and to the archbishop. He published at Bremen, *Speculum chirurgorum, Methodus medendi paronychie, Tractatus de polypo narium affectu gravissimo, and Gazophylacium polyposum fonticulisimo*; which four pieces were collected and published, with his life prefixed, at London, in 4to. 1729. Glandorp died young; and it must suggest a high opinion of his abilities, that, notwithstanding the great improvements in all branches of science, his works should be deemed worthy a republication 100 years after his death.

GLANVIL (Joseph), a learned, ingenious, but fanciful and credulous, writer in the 17th century, was born at Plymouth in 1636, and bred at Oxford. He became a great admirer of Mr Baxter, and a zealous person for a commonwealth. After the restoration, he published *The vanity of dogmatizing*; was chosen a fellow of the Royal Society; and, taking orders in 1662, was presented to the vicarage of Frome-Selwood in Somersetshire. This same year he published his *Lux Orientalis*; in 1665, his *Scythis Scientifica*; and in the year following, *Some philosophical considerations touching the being of witches and witchcraft*, and other pieces on the same subject. In 1660, he published *Plus ultra*; or, *The progress and advancement of knowledge since the days of Aristotle*. He likewise published *A seasonable recommendation and defence of reason*; and *Philosophia Pia*; or, *A discourse of the religious temper and tendencies of the experimental phi-*

Glaris
Glasgow.

philosophy. In 1678 he was made a prebendary of Worcester, and died in 1680.

GLARIS, one of the cantons of Switzerland, is bounded on the east, partly by the Grisons, and partly by the territory of Sargans; on the north, by the bailiwick of Gaster, and by the lake Wahlenstätt; on the east, by the canton of Schwitz; and on the south, by part of the canton of Uri, and part of the league of the Grisons. It is a mountainous country, being entirely within the Alps. Near the village Ober-Urnen there is a famous mineral spring; which is sometimes hot and sometimes cold. The lake Wahlenstätt is bounded by high rocks and mountains, through one of which a road is cut. Towards the top of one of these there is a large hole, through which the sky may be seen.

GLARIS, a town of Switzerland, capital of the canton of the same name. It is situated in a plain, at the foot of high craggy mountains. The streets are large, and the houses kept in good repair. It has some public buildings; among which are two churches, one in the middle of the town, and the other without, upon an eminence. On this eminence there is a cavern, with grotesque figures formed by the water that drops therein. The general assemblies of the country are held here on the first Sundays in May, where all the males above the age of sixteen are obliged to appear. Both the Calvinists and the Roman-Catholics are tolerated in this town, and they have divine service by turns in the same church. It is situated on the river Lint, E. Long. 9° 13'. N. Lat. 47° 6'.

GLASGOW, a large city of Lanarkshire or Clydesdale in Scotland, situated in W. Long. 4° 30'. N. Lat. 55° 50'.

Concerning the foundation of this city we have no authentic records. The word in the Gaelic language signifies a *gray-smith*; from whence it may perhaps be inferred, that some spot in the most ancient part of the city was originally the residence of some blacksmith, who had become eminent in his profession, so that the place went by his name.

Bishopric of
Glasgow,
when
founded.

In the year 560, a bishopric is said to have been founded here by Saint Mungo, or Kentigern, supposed to be the son of Thamates, daughter of Loth king of the Picts; but in what state the town at that time was, is altogether uncertain. Most probably the priests and disciples who attended St Kentigern, would contribute considerably towards its advancement: the aged and infirm, who were unfit for the purposes of war, or such as were religiously inclined, would come and settle round the habitation of the holy man, in order to have the benefit of his prayers; and as a number of miracles were said to have been wrought at his tomb, the same causes would still contribute to the increase of the town.

History has not informed us of the name of the prince who founded and endowed the bishopric of Glasgow in favour of St Kentigern. But from an abstract of the life of Kentigern (contained in Mr Innes's Critical Essay on the Ancient Inhabitants of Scotland) which was written in the 12th century, we learn, that the saint being ill used by Marken or Marcus, one of the kings of the Britons, retired into Wales. On the invitation of Roderic, however, one of Marken's successors, he returned to

Glasgow, and enjoyed the see till 601, when he died. He was buried in the church of Glasgow, where his monument is still to be seen; and we find him marked among the saints of the Roman calendar, January 13th 578.

The immediate successors of Kentigern were Baldebre and Conwal. The first established a religious house at Inchinnan, the second went into Lothian to preach to the Saxons; and both of them are ranked as saints in the Roman calendar, Baldebre on the 6th of March 608, and Conwal on the 18th of May 612. From this time, however, till the 1115 we have no distinct accounts concerning the city or bishopric of Glasgow. We find then, that David I. king of Scotland made an attempt to retrieve the people from a state of gross barbarity into which they were fallen, and restored to the church those lands of which they had been robbed. The only account we have of the transactions with regard to Glasgow, during that period, is in the inquisition made by David concerning the church-lands of Glasgow, and is as follows.—“This church, by the divine appointment, admitted St Kentigern into the bishopric, who furnished large draughts of knowledge to those thirsting after heavenly things, &c. But a fraudulent destroyer, employing his common wiles, brought in, after a long series of time, unaccountable scandals into the Cumbrian church. For after St Kentigern and many of his successors were removed to heaven, various disturbances every where arising, not only destroyed the church and her possessions, but, wasting the whole country, drove the inhabitants into exile. These good men being destroyed, various tribes of different nations flocking in from several quarters, possessed the fore-said deserted country; but being of different origins, and varying from each other in their language and customs, and not easily agreeing among themselves, they followed the manners of the Gentiles, rather than those of the true faith. The inhabitants of which unhappy and abandoned country, though living like brutes, the Lord, who chooseth that none should perish, vouchsafed to visit in mercy, &c.”

From the year 1116 to the reformation, the records of the bishopric are tolerably complete. The most remarkable particulars furnished by them are the following.

In 1136, John Achaius, chosen bishop of Glasgow by David I. built and adorned a part of the cathedral, which he solemnly consecrated on the 9th of July. The king was present at the ceremony; and bestowed on the church the lands of Perdey, now Patrick. This prelate also divided the diocese into the two archdeanries of Glasgow and Teviotdale; and established the offices of dean, subdean, chancellor, treasurer, sacrist, chanter, and successor; and settled a prebendary upon each of them, out of the donations he received from the king.

In 1174, Joceline, abbot of Melrose, was elected bishop, and consecrated by Eskilus, bishop of Lundun in Denmark. The Pope's legate for that kingdom, on the 1st of June 1175. He rebuilt the cathedral, or rather made an addition to the church already built by John Achaius. He also procured a charter from William, king of Scotland, erecting Glasgow into a royal borough, and likewise a charter for a royal borough.

Glasgow

Barbarity
the people
of David

Glasgow
erected
for a royal
burgh.

Glasgow. a fair to be held there annually for eight days.

In 1335, John Lindlay, bishop of Glasgow, was killed in an engagement at sea with the English, as he was returning home from Flanders. His successor, William Rae, built the stone bridge over the Clyde. In the time of Matthew Glendonings, who was elected bishop in 1387, the great spire of the church, which had been built only of wood, was consumed by lightning. The bishop intended to have built another of stone; but was prevented by death, in 1408, from accomplishing his purpose. His successor, William Lauder, laid the foundation of the vestry of the cathedral, and built the great tower of stone, as far as the first battlement. The great tower of the episcopal palace was founded about the year 1437, on which bishop Cameron expended a great deal of money.

In 1447, William Turnbull, a son of the family of Bedrule in Roxburghshire, was chosen bishop. He obtained from king James II. in 1450, a charter erecting the town and the patrimony of the bishops into a regality. He also procured a bull from pope Nicholas V. for erecting an university within the city, which he endowed, and on which he also bestowed many privileges. He died in 1454, leaving behind him a most excellent character. The establishment of the college contributed more than any thing that had been formerly done towards the enlargement of the town. Before this time the town seems to have been inconsiderable. Mr Gibson* is of opinion, that the number of its inhabitants did not exceed 1500. But though the establishment of the university greatly increased the number of inhabitants, it in fact destroyed the freedom of the town. Bishop Turnbull seems to have made a point of it with king James II. that the city of Glasgow, with the bishops' forest, should be erected into a regality in his favour; which was accordingly done at the time above-mentioned; and this at once took away all power from the citizens, and transferred it to the bishop. As the powers of the bishop, however, were reckoned by Turnbull insufficient to convey to the members of the university all that freedom which he wished to bestow upon them, he therefore obtained from the king a great many privileges for them; and afterwards he himself, with the consent of his chapter, granted them many more.

The good effects of the establishment of the college were very soon obvious in Glasgow. The number of inhabitants increased exceedingly; the high street, from the convent of the black friars, to where the cross is now placed, was very soon filled up; the ancient road which led to the common, being too far distant for the convenience of the new inhabitants, the Gallows-gate was begun to be built. Soon after, the collegiate church of the blessed Mary (now the Tron-church) being founded by the citizens, occasioned the Tron-gate street to be carried to the westward as far as the church. The rest of the city increased gradually towards the bridge, by the building of the Salt-market street. The burrough-roads, and the cattle that grazed on the commons, were now found insufficient to maintain the increased number of inhabitants; for which reason a greater degree of attention than formerly was paid to the fishing in the river. Many poor people subsisted themselves by this occu-

Vol. V.

pation: they were incorporated into a society; and in order that they might be at hand to prosecute their business, they built a considerable part of the street now called the *Bridge-gate*, but at that time *Fibbers-gate*.

Notwithstanding all this, however, the city of Glasgow did not for a long time attain the rank among the other towns of Scotland, which it holds at present. In 1556, it held only the 11th place among them, as appears by queen Mary's taxation. The introduction of the reformed religion proved for some time prejudicial to the opulence of the city. The money which had formerly been expended among the citizens by the bishop and his clergy, was now diverted into other channels: the advantages resulting from the university were also for a time lost; for as the reformers generally despised human learning, the college was in a manner deserted.

In the time of the civil wars, Glasgow suffered severely. To the mischiefs attending intestine discord, were added a pestilence and famine; and to complete their misfortunes, a violent fire broke out in June, which destroyed the greatest part of the Saltmarket, Tron-gate, and High-street. The fronts of the houses at that time were mostly of wood, so that they became an easy prey to the flames. The fire continued with great violence for the space of 18 hours; by which, a great many of the inhabitants were ruined, the habitations of almost 1000 families being totally destroyed. On this account collections were made through different parts of the country; and to prevent such accidents for the future, the fronts were built with free stone, which abounds in the neighbourhood.

By the charter given to bishop Turnbull in 1450, the citizens had been deprived of the power of electing their own magistrates, which was thenceforth exercised by the bishop; which, however, was not done without some resistance on the part of the inhabitants. After the reformation was introduced into Scotland, we find this power exercised by the citizens, the bishop, the earl of Lennox, and others. The idea that the town was a bishop's burgh, and not a royal free burgh, gave occasion to this unsettled manner of appointing the magistracy; and though, in 1633, they were declared to be a royal free burgh by the parliament, yet their freedom of election was afterwards disturbed by the privy-council, by Cromwell, and the duke of York. But on the 4th of June 1690, the town was declared free by a charter of William and Mary; and in confirmation of this charter it was inserted in the act of parliament, dated June 14th the same year, that they should have power to elect their own magistrates as fully and freely, in all respects, as the city of Edinburgh, or any other royal burgh within the kingdom; which freedom of election still continues.

By the assentment of the burghs in 1695, we find the city of Glasgow reckoned the second in Scotland in point of wealth, which place it still continues to hold. To account for this great increase of wealth, we must observe, that for a long time, even before the restoration of Charles II. the inhabitants of Glasgow had been in possession of the sale both of raw and refined sugars for the greatest part of Scotland; they had a privilege of distilling spirits from their molasses,

19 A.

free

Glasgow.

4
Glasgow
erected into
a regality,
and the uni-
versity
founded.

* Hist. of
Glasgow,
p. 74.

5
Which de-
stroys the
freedom of
the city.

6
Population
of Glasgow
increased
by the uni-
versity.

7
Great part
of the town
destroyed
by a fire.

8
Glasgow
declared
free by Wil-
liam and
Mary.

9
Great in-
crease of its
wealth.

Glasgow. free of all duty and excise; the herring-fishery was also carried on to what was at that time thought a very considerable extent; they were the only people in Scotland who made soap; and they sent annually some hides, linen, &c. to Bristol, from whence they brought back in exchange, a little tobacco, sugar, and goods of the manufacture of England, with which they supplied a considerable part of the kingdom. From the year 1707, however, in which the union between Scotland and England took place, we may date the prosperity of Glasgow. By the union, the American trade was laid open to the inhabitants: and so sensible were they of their advantageous situation, that they began almost instantly to prosecute that commerce; an assiduous application to which, ever since, hath greatly contributed to raise the city to that pitch of affluence and splendor which it now enjoys. The city was now greatly enlarged; and as the community were sensible of the inconvenience that attended the want of a sufficiency of water in the river, for carrying on their commerce, they resolved to have a port of their own, nigher the mouth of the river. At first, they thought of making their harbour at Dumbarton: but as this is a royal borough, the magistrates opposed it; because they thought that the influx of sailors and others, occasioned by the harbour, would be so great, that a scarcity of provisions would be occasioned. The magistrates and town-council of Glasgow, therefore, purchased some lands on the south side of the river Clyde for this purpose; and so expeditious were they in making their harbour, and rearing their town, that in 1710 a bailie was appointed for the government of Port-Glasgow. It is now a very considerable parish, and lies 14 miles nigher the mouth of Clyde than Glasgow.

7
Erection of
Port-Glas-
gow.

In 1725, Mr Campbell, the member of parliament for Glasgow, having given his vote for having the malt-tax extended over Scotland, a riot ensued among the lower class of people. In this disturbance, Mr Campbell's furniture was destroyed, and some excisemen were maltreated for attempting to take an account of the malt. General Wade, who commanded the forces in Scotland, had sent two companies of soldiers, under the command of Captain Buthell, to prevent any disturbance of this kind. Captain Buthell drew up his men in the street, where the multitude pelted them with stones. They endeavoured to disperse, by firing with powder only: but this expedient failing, he ordered his men to load their pieces with ball; and, without the sanction of the civil authority, commanded them to fire four different ways at once. By this discharge about 20 persons were killed and wounded; which enraged the multitude to such a degree, that having procured some arms, they pursued Buthell and his men to the castle of Dumbarton, about five miles distant.

11
Disturbance
about the
excise-bill.

General Wade being informed of this transaction, assembled a body of forces, and being accompanied by Duncan Forbes, lord advocate, took possession of the town: the magistrates were apprehended, and carried prisoners to Edinburgh; but on an examination before the lords, their innocence clearly appeared, upon which they were immediately dismissed. Buthell was tried for murder, convicted, and condemned; but, instead of suffering the penalties of law, he was

indulged with a pardon, and promoted in the service. Mr Campbell petitioned the House of Commons for an indemnification of his losses: a bill was passed in his favour; and this, together with some other expenses incurred in the affair, cost the town 9000 l. ster.

During the time of the rebellion in 1745, the citizens of Glasgow gave proof of their attachment to revolution principles, by raising two battalions, of 600 men each, for the service of government. This piece of loyalty, however, had like to have cost them dear. The rebels, in their journey fourth, took a resolution to plunder and burn the city; which would probably have been done, had not Mr Cameron of Lochiel threatened, in that case, to withdraw his clan. A heavy contribution, however, was laid on. The city was compelled to pay 5000 l. in money, and 500 l. in goods; and on the return of the rebels from England, they were obliged to furnish them with 12,000 linen shirts, 6000 cloth coats, 6000 pairs of shoes, 6000 pairs of hose, and 6000 bonnets. These goods, with the money formerly paid them, the expense of raising and subsisting the two city-battalions, and the charge of maintaining the rebel army in free quarters for ten days, cost the community about 14,000 l. sterling; 10,000 l. of which they recovered in 1749, by an application to parliament.

About the year 1750, a very considerable change took place in the manner of living among the inhabitants of Glasgow. Till this time, an attentive industry, and a frugality bordering upon parsimony, had been their general characteristic; the severity of the ancient manners prevailed in its full vigour; But now, when an extensive commerce and increased manufactures had produced wealth, the ideas of the people were enlarged, and schemes of trade and improvement were adopted, which people would formerly have been denominated madmen if they had undertaken; a new stile was introduced in living, dress, building, and furniture; wheel-carriages were set up, public places of entertainment were frequented; and an assembly-room, ball-room, and playhouse, were built by subscription; and from this time we may date all the improvements that have taken place, not only in Glasgow, but all over the west of Scotland. The best method, however, of estimating the growing improvement of any town, is by the frequency of their applications for assistance to parliament; we shall therefore enumerate the acts of parliament which have been passed in favour of the city of Glasgow since the year 1750. In 1753, an act passed for repairing several roads leading into the city of Glasgow.—In 1756, an act for erecting and supporting a light-house in the island of Little Cumray, at the mouth of the Clyde, and for rendering the navigation of the frith and river more safe and commodious.—In 1759, an act for improving the navigation of the river Clyde to the city of Glasgow, and for building a bridge across the river from the city to the village of Gorbells.—In 1767, the people of Glasgow having proposed to make a small cut or canal from the frith of Forth to that of Clyde, for the convenience of their trade to the eastern side of the island, several gentlemen at Edinburgh, and throughout different parts of the kingdom, proposed that this canal should be executed upon a much larger scale than what had been originally projected. An act was accordingly obtained,

Glasgow.

22
Change of
manners
and method
of living.

23
Acts of
parliament
in favour of
the city.

and

Glasgow.

and the canal executed in the manner described under the article CANAL.—In 1770, another act was obtained for improving the navigation of the river, and for building the bridge from the city to the village of Gorbells, being an amendmēt of the former act for that purpose.—In 1771, an act for making and widening a passage from the Salt-market to St Andrew's church; for enlarging and completing the church-yard of that church, and likewise for building a convenient exchange or square in the city; also for amending and explaining the former act relative to the navigation of the Clyde.—An act for making and maintaining a navigable canal and waggon-way from the collieries in the parishes of Old and New Monkland, to the city of Glasgow.

This last canal, which was undertaken with a view to reduce the price of coals, has not been attended with the desired effect. The other improvements have been productive of very great advantages: and it may be confidently asserted, that since the year 1750 a total change has been effected in the city of Glasgow and all round it; the manners of the people have undergone an alteration greatly for the better; a spirit of industry and activity has been raised, and now pervades every order of men; commerce has been increased; manufactures carried on to a considerable extent, and still increasing; every person is employed; not a beggar is to be seen in the streets; the very children are busy.

14
Description
of the city.

Such is the present flourishing state of the city of Glasgow, which for its beauty and elegance exceeds every other city in Scotland. The most ancient part of it stands on a rising ground. The foundation of the cathedral is 104 feet higher than the bed of the river; and the descent from the high ground reaches to about 100 yards below the college. The rest of the city is built upon a plain. The city reaches from north to south, *i. e.* from the Stable-green port, to the fourth end of the Gorbells, 2000 yards; from east to west, *i. e.* from the Gallowgate toll-bar to Grahamestown toll-bar, 3160 yards. The streets are clean and well paved; the medium breadth of the principal ones is 52 feet; and several of them intersecting one another at right angles, produce a very fine effect. The houses, excepting a very few, are built of free-stone well hewed; few of them exceed four floors in height; and many of them are in an exceeding good taste, inasmuch that Mr Pennant pronounces Glasgow to be the best second-rate city he had ever seen. The most remarkable public buildings are,

15
Of the ca-
thedral.

1. *The Cathedral, or High Church*, is a magnificent building, and its situation greatly to its advantage, as it stands higher than any part of the city. It has been intended to form a cross, though the traverse part has never been finished. The great tower is founded upon four large masonry pillars, each of them about 30 feet in circumference. The tower itself is 25½ feet square within; and is surrounded by a ballustrade, within which rises an octangular spire terminated by a vane. The tower upon the west end is upon the same level, but appears not to have been finished, though it is covered over with lead. In this tower is a very large bell 11 feet 4 inches in diameter. The principal entry was from the west; the gate 11 feet broad at the base,

and 17 feet in height. The west end of the choir is now appropriated for a place of divine worship; and is divided from the remaining part by a stone-partition, which is inclosed by another stone-wall parting it from the nave. It is impossible to form an adequate idea of the awful solemnity of the place occasioned by the loftiness of the roof and the range of pillars by which the whole is supported.

The nave of the church rises four steps higher than the choir; and on the west side stood the organ-loft, formerly ornamented with a variety of figures, but now defaced. The pillars here are done in a better taste than those in the choir, and their capitals are ornamented with fruits. The arched roof of the altar is supported by five pillars, over which was a fine terrace walk, and above it a large window of curious workmanship, but now shut up. On the north side of the altar is the vestry, being a cube of 28 feet, the roof arched and vaulted at top, and supported by one pillar in the centre of the house. Arched pillars from every angle terminate in the grand pillar, which is 19 feet high. The lower part of the fourth cross is made use of as a burying place for the clergy of the city; and is by much the finest piece of workmanship in the whole building. It is 55 feet long, 28 broad, and 15 high; arched and vaulted at top, and supported by a middle range of pillars, with their capitals highly ornamented; corresponding to which are columns adjoining to the walls, which as they rise, spring into semi-arches, and are every where met at acute angles by their opposites, and are ornamented with carvings at the closing and crossing of the lines. At the east end of the choir you descend by flights of steps upon each side into passages which, in former times, were the principal entries to the burying vault which is immediately under the nave. It is now made use of as a parish-church for the barony of Glasgow; and is full of pillars, some of them very maffy, which support the arched roof: but it is a very uncomfortable place for devotion. The space under the altar and vestry, though now made use of as a burying place by the heritors of the barony, was formerly, according to tradition, employed for keeping of the relics; and indeed, from the beautiful manner in which this place is finished, one would imagine that it had not been destined for common use. Here is shewn the monument of St Mungo, or Kentigern, with his figure lying in a cumbent posture.

The whole length of the cathedral within the walls is 284 feet; its breadth 65; the height of the choir, from the floor to the canopy, 90 feet; the height of the nave, 85 feet; the height of the middle tower, 220 feet. This fabric was begun by John Achaius in 1123, and consecrated in 1136; and continued by succeeding bishops till such time as it was finished in the manner in which it stands at present. The wealth of the see of Glasgow, however, was not sufficient for so great an undertaking, so that they were obliged to have recourse to all the churches of Scotland for assistance in it. Near the cathedral is the ruin of the castle or bishop's palace.

2. *St Andrew's Church* was begun by the community in 1739, and finished in 1756. It is the finest piece of modern architecture in the city; and is built after the model of St Martins in the fields, London,

Glasgow.

16
St. An-
drew's
church.

whose architect was the famous Gibbs. The length of the church is 104 feet, and its breadth 66. It has a fine arched roof, well ornamented with figures in stucco, and sustained by stone-columns of the Corinthian order. Correspondent to the model, it has a place for the altar on the east, in which is a very ancient Venetian window; but the altar-place being feated makes this end appear to no great advantage. The fronts of the galleries and the pulpit are done in mahogany in a very elegant manner. The spire by no means corresponds with the rest of the building; and, instead of being an ornament, disgraces this beautiful fabric. Its height is 170 feet.

17
The col-
lege.

3. *The College.* The front of this building extends along the east side of the high street, and is upwards of 330 feet long. The gate at the entrance is decorated with rustics, and over it are the king's arms. The first court is 88 feet long and 44 broad. The west side is elevated upon stone pillars, on which are placed pilasters supporting the Doric entablature, and ornamented with arches forming a piazza. Above these is the public hall; the ascent to which is by a double flight of steps inclosed by a handsome stone balustrade, upon the right of which is placed a lion, and on the left an unicorn, cut in free stone. The spire stands on the east side, is 135 feet high, and has a very good clock. Under this is the gateway into the inner and largest court, which is 103 feet long and 79 broad. Over the entry, in a niche, is a statue of Mr Zacharias Boyd, who was a benefactor to the university. On the east side of the court is a narrow passage leading into a handsome terrace walk, gravelled, 122 feet long by 64 feet broad. This walk is inclosed to the east by an iron pallisade, in the centre of which is a gate leading into the garden. This last consists of seven acres of ground, laid out in walks for the recreation of the students. On the south side of the walk stands the library; a very neat edifice, well constructed for the purpose intended, and containing a very valuable collection of books.

18
Town-
ouic, &c.

5. *The Town-House and Assembly-Hall.* This is a magnificent and extremely elegant building. The front is adorned with a range of Ionic pilasters; the top of the building is ornamented with a balustrade and handsome vases; the front is elevated on strong rusticated pillars adorned with arches, forming a piazza for merchants and others to shelter themselves from the weather when met upon business. The assembly-hall is a neat room, and is finished in a good taste, though too small for the city; its length is 47 feet, its breadth and height 24. The town-hall is a very spacious and lofty apartment, 52 feet long by 27 broad, and 24 in height. It is finished in a very grand manner; the ceiling is divided into different compartments well ornamented. In it are full-length portraits of king James VI. and VII. Charles I. and II. William and Mary, queen Anne, king George I. II. and III. and Archibald duke of Argyle in his judiciary robes. The two last are by Ramsay. Opposite to the front of this building is the exchange, which is well paved with free stone, and inclosed from the street by stone pillars. Upon it is an equestrian statue of king William III. placed upon a lofty pedestal, and surrounded with an iron rail.

19
Guild-hall.

5. *The Guild-Hall, or Merchants House.* This building is situated upon the south side of Bridge-gate street; and is in length 82 feet, in breadth 31.

The great hall, which is the whole length and breadth of the building, is so capacious, that it is better adapted for the reception of great and numerous assemblies than any other in the city. This house is adorned with a very elegant spire 200 feet high.

20
Town's ho-
spital.

6. *The Town's Hospital* is a very neat building, consisting of two wings and a large front: the length 156 feet, the breadth of the centre 30 feet, and the depth of the wings 68 feet. Behind the building is an infirmary 127 feet long by 25 feet broad, the ascent to which is by a flight of steps. The lower part of this building is appointed for the reception of lunatics. The area between the buildings is large, which, with the agreeable open situation of the hospital on the river, must conduce to the health of the inhabitants.

21
New bridge

7. *The New Bridge* is built in an elegant manner. It is 32 feet wide; with a commodious foot-way for passengers, five feet broad on each side, raised above the road made for carriages, and paved with free stone. This bridge is about 500 feet in length; and consists of seven arches, the faces of which are wrought in rustic, with a strong block-cornice above. The arches spring but a little way above low-water mark; which, tho' it renders the bridge stronger than if they sprung from taller piers, diminishes its beauty. Between every arch there is a small circular one: these break the force of the water when the river rises to a flood, and add to the strength of the whole. The parapet-wall or breast-work is cut out in the Chinese taste; and the two ends are finished off with a sweep.

22
Markets,
&c.

8. *The Markets in King's Street* are justly admired, as being the completest of their kind in Britain. They are placed on both sides of the street. That on the east side, appropriated entirely for butcher-meat, is 112 feet in length, and 67 in breadth. In the centre is a spacious gateway, decorated on each side with coupled Ionic columns set upon their pedestals, and supporting an angular pediment. At the north end is a very neat hall belonging to the incorporation of butchers, the front ornamented with rustics and a pediment. The markets upon the west side of the street consist of three courts, set apart for fish, mutton, and cheefe. The whole of the front is 173 feet, the breadth 46 feet; in the centre of which, as on the opposite side, is a very spacious gateway of the Doric order, supporting a pediment. This is the entry to the mutton-market. Each of the other two has a well-proportioned arch faced with rustics for their entrance. All these markets are well paved with free stone; have walks all round them; and are covered over for shelter by roofs standing upon stone piers, under which the different commodities are exposed to sale. They have likewise pump-wells within, for cleaning away all the filth; which render the markets always sweet and agreeable.

9. *The Guard-House* is a very handsome building, with a piazza formed by arches, and columns of the Ionic order set upon their pedestals. The entablature supports at Attic course, in which are oval port-holes ornamented with palm-branches.

10. *The Herb-Market*, is neat and commodious; in length 130, and in breadth 41 feet. The principal entry is decorated with coupled Ionic columns, supporting an angular pediment. It is laid out in the same manner with the markets in King's-street.

The most remarkable public charities in Glasgow are,

1. *Muir-*

Glasgow.

23
Public cha-
rities.

1. *Muirhead's or St Nicholas's Hospital.* This was originally appointed to subsist 12 old men and a chaplain: but its revenues have, from some unknown causes, been lost; so that no more of them now remains than the paltry sum of 139l. 2s. 5d. Scots money, 128 l. of which is annually divided among four old men annually, at the rate of 2 l. 13s. 4d. each.

2. *Hutcheson's Hospital,* was founded and endowed in 1639 by George Hutcheson of Lamb-hill, notary-public, and Mr Thomas Hutcheson his brother, who was bred a preacher, for the maintenance of old men and orphans. The funds of this hospital were afterwards increased by James Blair merchant in Glasgow, in 1710; and by subsequent donations, the managers now have it in their power to give away above 900l. Sterling in pensions, from 5 l. 10s. to 10 l. per pensioner.

3. *The Town's Hospital* was opened for the reception of the poor on the 15th of November 1733. The funds from whence this hospital is subsisted are, the general session, the town-council, the trades house and merchants house, the interest of money belonging to their funds, which are sums that have been mortified for the use of the house. These supplies, however, are found insufficient to defray the expences of the house; for which reason an assessment is annually made upon the inhabitants in the following manner. The magistrates nominate 12, 14, or sometimes more gentlemen of known integrity and character, who have a list laid before them of all the inhabitants in town. This list they divide into 16 or 18 columns. Each of these columns contains the names of such inhabitants as carry on trade to a certain extent, or are supposed to be well able to pay the sum affixed to the particular column in which their names are inserted. If it is necessary to raise 500l. for instance, then each name, in every separate column, is valued at as much as the fortunes of the persons in each particular column are supposed to be. If 1000l. or more is to be raised, it is only continuing a proportional increase through the whole of the columns. The highest sum that ever was thus raised, was 12 s. 6d. upon every thousand pounds that each person was supposed to be worth. The number of people maintained in this hospital are about 620.

24
Members of
the univer-
sity.

The university of Glasgow owes its origin, as we have already observed, to bishop Turnbull. The institution consisted at first of a rector, a dean of faculty, a principal who taught theology, and three professors of philosophy; and, soon after this, the civil and canon laws were taught by some clergymen. From the time of its establishment in 1450 to the reformation in 1560, the college was chiefly frequented by those who were intended for the church; its members were all ecclesiastics, and its principal support was derived from the church. The reformation brought the university to the verge of destruction: masters, students, and servants, all forsook it. The magistrates were so sensible of the loss which the community had sustained by this desertion, that they endeavoured to restore it in 1572, by bestowing upon it considerable funds, and prescribing a set of regulations for its management. These, however, proved insufficient; for which reason king James VI. erected it anew, by a charter called the *Nova Erectio*, in 1577, and bestowed upon it the tithes of the

parish of Govan. The persons who were to compose the new university were, a principal, three professors of philosophy, four students bursars, one oeconomus, a principal's servant, a janitor, and cook.

Since the year 1577, the funds of the university have been considerably increased by the bounty of kings and the donations of private persons. The professors have therefore also been increased; so that at present the university of Glasgow consists of a chancellor, rector, dean of faculty, principal, and 13 professors, together with bursars, &c. The archbishop of Glasgow was formerly chancellor of the university *ex officio*; at present, the chancellor is chosen by the rector, dean of faculty, principal, and masters.

The chancellor, as being the head of the university, is the fountain of honour, and in his name are all academical degrees bestowed. The office of rector is to exercise that academical jurisdiction in disputes among the students themselves, or between the students and citizens, which is bestowed upon the greater part of the universities in Europe. He is chosen annually in the *comitia*; that is, in a meeting in which all the students, as well as the other members of the university, have a voice. Immediately after his admission, he has been in use to choose certain persons as his assessors and counsellors in his capacity of judge; and, in former periods, it was customary to name the ministers of Glasgow, or any other gentlemen who had no connection with the university; but, for a great while past, the rector has constantly named the dean of faculty, the principal, and masters for his assessors; and he has always been, and still is, in the daily practice of judging in the causes belonging to him, with the advice of his assessors. Besides these powers as judge, the rector summons and presides in the meetings of the university for the election of his successor; and he is likewise in use to call meetings of the professors for drawing up addresses to the king, electing a member to the general assembly, and other business of the like kind.

The dean of faculty has, for his province, the giving directions with regard to the course of studies; the judging, together with the rector, principal, and professors, of the qualifications of those who desire to be created masters of arts, doctors of divinity, &c., and he presides in meetings which are called by him for these purposes. He is chosen annually by the rector, principal, and masters.

The principal and masters, independent of the rector and dean, compose a meeting in which the principal presides; and, as they are the persons for whose behalf chiefly the revenue of the college was established, the administration of that revenue is therefore committed to them.

The revenue arises from the tithes of the parish of Govan, granted by king James VI. in 1557; from the tithes of the parishes of Renfrew and Kilbride, granted by the same monarch in 1617, and confirmed by king Charles I. on the 28th of June 1630; from the tithes of the parishes of Calder, Old and New Monkland, conveyed to them by a charter from Charles II. in 1670; from a tack of the archbishopric; and from several donations received from private persons.

The college of Glasgow, for a very considerable time after its erection, followed the mode of public teaching which is common even to this day in Oxford

and

and Cambridge, and in many other universities throughout Europe; that is, each professor gave a few lectures every year, *gratis*, upon the particular science which he professed: but, in place of this, the professors have, for a great while past, adopted the mode of private teaching; that is, they lecture and examine two hours every day during the session, viz. from the 30th of October to the 10th of June; a method which comes much cheaper to the student, as he has it in his power, if he is attentive, to acquire his education without being under the necessity of employing a tutor. They have also private classes, in which they teach one hour per day. The fixed fee for a public class is 1 l. 11 s. 6 d. per session; the fixed fee for a private one is 1 l. 1 s. per d°. The number of students who have attended this college for several years past, has been upwards of 500 each season.

25
History of
the trade of
Glasgow.

The trade of Glasgow is said to have been first promoted by one Mr William Elphinstone in 1420. This trade was most probably the curing and exporting of salmon; but the first authentic document concerning Glasgow as a trading city is in 1546. Complaints having been made by Henry VIII. king of England, that several English ships had been taken and robbed by vessels belonging to Scotland, an order of council was issued, discharging such captures for the future; and among other places made mention of in this order is the city of Glasgow. The trade which at that time they carried on could not be great. It probably consisted of a few small vessels to France loaded with pickled salmon; as this fishery was, even then, carried on to a considerable extent, by Glasgow, Renfrew, and Dumbarton. Between the year 1630 and 1660, a very great degree of attention seems to have been paid to inland commerce by the inhabitants of Glasgow. Principal Baillie informs us, that the increase of Glasgow arising from this commerce was exceedingly great. The exportation of salmon and of herrings was also continued and increased. In the war between Britain and Holland during the reign of Charles II. a privateer was fitted out in Clyde to cruise against the Dutch. She was called the *Lion of Glasgow*, Robert McAllan commander; and carried five pieces of cannon, and 60 hands.

A spirit of commerce appears to have arisen among the inhabitants of Glasgow between the year 1660 and 1707. The citizens who distinguished themselves most during this period were Walter Gibson and John Anderlon. Gibson cured and packed in one year 300 lasts of herrings, which he sent to St Martins in France on board of a Dutch vessel, called the *St Agate*, of 450 tons burthen; his returns were brandy and salt. He was the first who imported iron from Stockholm into Clyde. Anderlon is said to have been the first who imported white-wines.

Whatever their trade was at this time, it could not be considerable: the ports to which they were obliged to trade lay all to the eastward: the circumnavigation of the island would therefore prove an almost unsurmountable bar to the commerce of Glasgow; and of consequence the people on the east coast would be possessed of almost all the commerce of Scotland. The union with England opened a field for commerce for which the situation of Glasgow was highly advantageous. Since that time the commerce of the east

coast has declined, and that of the west increased to an amazing degree. No sooner was the treaty of union signed, than the inhabitants of Glasgow began to prosecute the trade to Virginia and Maryland; they chartered vessels from Whitehaven, sent out cargoes of goods, and brought back tobacco in return. The method in which they at first proceeded in this trade, was certainly a very prudent one. A supercargo went out with every vessel. He bartered his goods for tobacco, until such time as he had either sold all his goods, or procured as much tobacco as was sufficient to load his vessel. He then immediately set out on his return; and if any of his goods remained unsold, he brought them home with him. While they continued to trade in this way, they were of great advantage to the country, by the quantity of manufactures which they exported; their own wealth began to increase; they purchased ships of their own; and, in 1718, the first vessel of the property of Glasgow crossed the Atlantic. Their imports of tobacco were now considerable, and Glasgow began to be looked upon as a considerable port; the tobacco-trade at the ports of Bristol, Liverpool, and Whitehaven, was observed to dwindle away; the people of Glasgow began to send tobacco to these places, and to undersell the English even in their own ports. Thus the jealousy of the latter was soon excited, and they took every method in their power to destroy the trade of Glasgow. The people of Bristol presented remonstrances to the commissioners of the customs at London against the trade of Glasgow, in 1717. To these remonstrances the merchants of Glasgow sent such answers to the commissioners as convinced them that the complaints of the Bristol merchants were without foundation. But in 1721, a most formidable confederacy was entered into by almost all the tobacco-merchants in South Britain against the trade of Glasgow. Those of London, Liverpool, and Whitehaven, presented severally to the Lords of the Treasury, petitions, arraigning the Glasgow merchants of frauds in the tobacco trade. To these petitions the Glasgow people gave in replies; and the lords of the treasury, after a full and impartial hearing, were pleased to dismiss the cause with the following sentence: "That the complaints of the merchants of London, Liverpool, and Whitehaven, were groundless; and that they proceeded from a spirit of envy, and not from a regard to the interest of trade, or of the king's revenue."

But the malice of these gentlemen did not stop here. They brought their complaints into the house of commons. Commissioners were sent to Glasgow in 1722, who gave in their reports to the house in 1723. The merchants sent up distinct and explicit answers to these reports; but such was the interest of their adversaries, that these answers were disregarded. New officers were appointed at the ports of Greenock and Port-Glasgow, whose private instructions seem to have been, to ruin the trade if possible, by putting all imaginable hardships upon it. In short, every species of persecution, which malice assisted by wealth and interest could invent, were put in practice to destroy the trade of Glasgow; and they in part succeeded. It languished till the year 1735; but after that began to revive, though even after its revival it was carried on but slowly for a considerable space of time.

With

Glasgow.

26
Manufac-
tures of
Glasgow.

With regard to the manufactures of Glasgow, Mr Gibbon is of opinion that the commerce to America first suggested the idea of introducing them, in any considerable degree at least. The first attempts in this way were about the year 1725, and their increase for some time was very slow, nor did they begin to be considerable till great encouragement was given by the legislature to the linen manufacture in Scotland. The first causes of the success of this manufacture were the act of parliament in 1748, whereby the wearing of French cambrics was prohibited under severe penalties; that of 1751, allowing weavers in flax or hemp to settle and exercise their trades any where in Scotland free from all corporation-dues; and the bounty of three-halfpence per yard on all linsens exported at and under 18d. per yard. Since that time a spirit of manufacture has been excited among the inhabitants of Glasgow; and great variety of goods, and in very great quantity, have been manufactured. Checks, linen, and linen and cotton, are manufactured to a great extent. Printed linsens and cottons were begun to be manufactured in 1738; but they only made garments till 1754, when handkerchiefs were first printed. There is no manufacture more upon the increase in Glasgow than this; nor can any branch be more beneficial to the country, as the cloths on which they print are all made in Scotland; whereas at London, and through the greatest part of England, the cloths they print upon are all imported from Germany.

A manufactory of ribbons has been very lately introduced into Glasgow; and though this branch of business is yet in its infancy, they are made equal in quality to those in England, and rather cheaper.

Incels were first made here about the year 1732. The engine-ooms used at that time were so inconvenient, and took up so much time in making the goods, that the Dutch, who were the only people possessed of the large incels, were almost solely in possession of this manufacture. Mr Hervey, who began this branch in Glasgow, was so sensible of the disadvantages under which it laboured, that he went over to Holland; and, in spite of the care and attention which the Dutch took to conceal their methods of manufacturing, he brought over with him from Harlem two of their looms, and one of their workmen. This Dutchman remained some years in Glasgow; but on some disgust he went to Manchester, and instructed the people there in the method of carrying on the manufacture.

In 1757, carpets were begun to be made, and are now carried on to a considerable extent. Hunters cloths, English blankets, and other goods of the same kind, are also made; and, with proper attention, these manufactures certainly will succeed.

Besides these, a great variety of articles are manufactured at Glasgow, of which our limits will not permit us to enter into a detail, such as soap, refining of sugar, iron-mongery, brass, jewellery, &c.—Types for printing are made in this city by Dr Wilson and Sons, perhaps superior to any others in Europe. Printing of books was first begun here by George Anderlon about the year 1638. But there was no good printing in Glasgow till the year 1735; when Robert Urie printed several books in a very elegant manner. The highest perfection, however, to which printing hath yet been carried in this place, or perhaps in any other, was by the

late Robert and Andrew Foulis, (who began in the year 1740;) as the many elegant and splendid editions of books printed by them in different languages sufficiently testify. The same gentlemen also established an academy of painting; but the wealth of Scotland being unequal to the undertaking, it hath been since given up.

The government of the city of Glasgow is vested in a provost and three bailies, a dean of guild, deacon-conveener, and a treasurer, with a common council of 13 merchants and 12 mechanics. The provost and two of the bailies must, by the set of the burgh, be elected from the merchant rank, and the other bailie from the trades rank, *i. e.* the mechanics. The provost is, from courtesy and custom, styled *lord provost*. He is properly lord of the police of the city, president of the community, and is *ex officio* a justice of the peace for both the burgh and county.

The revenue of Glasgow amounts to about L. 6000 Sterling *per annum*. It arises from a duty upon all grain and meal brought into the city, (this tax is denominated *the ladder*); from the rents of lands and houses the property of the community; from an impost of two pennies Scots upon every Scots pint of ale or beer brewed, inbrought, or sold, within the city; from certain dues payable out of the markets; from the rents of the seats in churches; from the dues of crannage at the quay, at the weigh-house, tonnage on the river, pontage on the bridge, statute-work within the burgh, &c. The number of inhabitants is computed to be about 43,000.

GLASS, a transparent, brittle, facitious body, produced from sand melted in a strong fire with fixed alkaline salts, lead, flags, &c. till the whole becomes perfectly clear and fine. The word is formed of the Latin *glafum*, a plant called by the Greeks *glafis*, by the Romans *vitrum*, by the ancient Britons *gudum*, and by the English *wasad*. We find frequent mention of this plant in ancient writers, particularly Cæsar, Vitruvius, Pliny, &c. who relate, that the ancient Britons painted or dyed their bodies with *glafum*, *gudum*, *vitrum*, &c. *i. e.* with the blue colour procured from this plant. And hence, the facitious matter we are speaking of came to be called *glafi*; as having always somewhat of this bluishness in it.

At what time the art of glafs-making was first invented, is altogether uncertain. Some imagine it to have been invented before the flood: but of this we have no direct proof, though there is no improbability in the supposition; for we know, that it is almost impossible to excite a very violent fire, such as is necessary in metallurgic operations, without vitrifying part of the bricks or stones wherewith the furnace is built. This indeed might furnish the first hints of glafs-making; tho' it is also very probable, that such imperfect vitrifications would be observed a long time before people thought of making any use of them.

Neri traces the antiquity of glafs as far back as the time of Job. That writer, speaking of the value of wisdom, chap. xxviii. verse 17, says, that gold and crystal cannot equal it. But this word, which Neri will have to signify facitious glafs, is capable of a great many different interpretations, and properly signifies only whatever is beautiful or transparent. Dr Merret will have the art to be as ancient as that of pottery or the

Glasgow.
Glasf.27
Govern-
ment, reve-
nue, &c. of
the city.History of
glafs-making.

Glasf.

the making of bricks, for the reasons already given, viz. that by all vehement heats some imperfect vitrifications are produced. Of this kind undoubtedly was the fossil glass mentioned by Ferant. Emperor. to have been found under-ground where great fires had been. But it is evident, that such imperfect vitrifications might have passed unnoticed for ages; and consequently we have no reason to conclude from thence, that the art of glass-making is of such high antiquity.

The Egyptians boast, that this art was taught them by their great Hermes. Aristophanes, Aristotle, Alexander, Aphroditeus, Lucretius, and St John the divine, put it out of all doubt that glass was used in their days. Pliny relates, that it was first discovered accidentally in Syria, at the mouth of the river Belus, by certain merchants driven thither by a storm at sea; who being obliged to continue there, and dress their victuals by making a fire on the ground, where there was great plenty of the herb kali; that plant, burning to ashes, its salts mixed and incorporated with the sand, or stones fit for vitrification, and thus produced glass; and that this accident, being known, the people of Sidon, in that neighbourhood, essayed the work, and brought glass into use; since which time the art has been continually improving. Be this as it will, however, the first glass-houses mentioned in history were erected in the city of Tyre, and here was the only staple of the manufactory for many ages. The sand which lay on the shore for about half a mile round the mouth of the river Belus was peculiarly adapted to the making of glass, as being neat and glittering; and the wide range of the Tyrian commerce gave an ample vent for the productions of the furnace. It appears, however, that before the conquest of Britain by the Romans, glass-houses had been erected in this island, as well as in Gaul, Spain, and Italy. Hence, in many parts of the country are to be found annulets of glass, having a narrow perforation and thick rim, denominated by the remaining Britons *gleineu naidreedb*, or *glass adders*, and which were probably in former times used as amulets by the druids *. It can scarcely be questioned that the Britons were sufficiently well versed in the manufacture of glass, to form out of it many more useful instruments than the glass-beads. History indeed assures us, that they did manufacture a considerable quantity of glass vessels. These, like their annulets, were most probably green, blue, yellow, or black, and many of them curiously streaked with other colours. The process in the manufacture would be nearly the same with that of the Gauls or Spaniards. The sand of their shores being reduced to a sufficient degree of fineness by art, was mixed with three fourths of its weight of their nitre (much the same with our kelp), and both were melted together. The metal was then poured into other vessels, where it was left to harden into a mass, and afterwards replaced in the furnace, where it became transparent in the boiling, and was afterwards figured by blowing, or modelling in the lath, into such vessels as they wanted.

It is not probable that the arrival of the Romans would improve the glass manufactory among the Britons. The taste of the Romans at that time was just the reverse of that of the inhabitants of this island. The former preferred silver and gold to glass for the composition of their drinking vessels. They made indeed

great improvements in their own at Rome, during the government of Nero. The vessels then formed of this metal rivalled the bowls of porcelain in their clearness, and equalled the cups of crystal in their transparency. But these were by far too costly for common use; and therefore, in all probability, were never attempted in Britain. The glass commonly made use of by the Romans was of a quality greatly inferior; and, from the fragments which have been discovered at the stations or towns of either, appear to have consisted of a thick, sometimes white, but mostly blue-green, metal.

With regard to the theory of vitrification, we are almost totally in the dark. In general, it seems to be that state, in which solid bodies are, by the vehement action of fire, fitted for being dissipated, or carried off in vapour. In all vitrifications, there is a plentiful evaporation; and if any solid substance is carried off in vapour by the intense heat of a burning speculum, a vitrification is always observed previously to take place. The difference, then, between the state of fusion and vitrification of a solid body we may conceive to be, that in the former the element of fire acts upon the parts of the solid in such a manner as only to disjoin them, and render the substance fluid; but, in vitrification, the fire not only disjoins the particles, but combines with them in a latent state, into a third substance; which, having now as much fire as it can contain, can receive no further change from that element, except being carried off in vapour.

But, though we are unable to effect this change upon solid bodies without a very violent heat, it is otherwise in the natural processes. By what we call *crystallization*, nature produces more perfect glasses than we can make with our furnaces. These are called *precious stones*; but in all trials they discover the essential properties of glass, and not of stones. The most distinguishing property of glass is its resisting the force of fire, so that this element cannot calcine or change it as it does other bodies, but can only melt it, and then carry it off in vapours. To this last all the precious stones are subject. The diamond (the hardest and most ponderous of them all) is dissolvable in a less degree of heat than what would dissipate common glass. Nor can it be any objection to this idea, that some kinds of glass are capable of being converted into a kind of porcelain by a long-continued cementation with certain materials. This change happens only to those kinds of glass which are made of alkaline salt and sand; and Dr Lewis hath shewn that this change is produced by the dissipation of the saline principle, which is the least fixed of the two. Glass, therefore, we may still consider as a substance upon which the fire, has no other effect than either to melt, or dissipate it in vapour.

The other properties of glass are very remarkable, Remarkable some of which follow.

1. It is one of the most elastic bodies in nature. If the force with which glass-balls strike each other be reckoned 16, that wherewith they recede by virtue of their elasticity will be nearly 15.

2. When glass is suddenly cooled, it becomes exceedingly brittle; and this brittleness is sometimes attended with very surprising phenomena. Hollow bells made of unannealed glass, with a small hole in them, silver

* See *Antiquum Quum*.

Glasf.

Theory of vitrification uncertain.

3. Remarkable properties of glass.

Glas.

Glas.

4
Surprising
fragility of
annealed
glass.

will fly to pieces by the heat of the hand only, if the hole by which the internal and external air communicate be stopped with a finger. Lately, however, some vessels made of such annealed glass have been discovered, which have the remarkable property of resisting very hard strokes given from without, though they shiver to pieces by the shocks received from the fall of very light and minute bodies dropped into their cavities. Those glasses may be made of any shape; all that needs be observed in making them is, that their bottoms be thicker than their sides. The thicker the bottom is, the easier do the glasses break. One whose bottom is three fingers breadth in thickness, flies with as much ease at least as the thinnest glass. Some of these vessels have been tried with strokes of a mallet sufficient to drive a nail into wood tolerably hard, and have held good without breaking. They have also resisted the shock of several heavy bodies let fall into their cavities, from the height of two or three feet; as musket-balls, pieces of iron, or other metal, pyrites, jasper, wood, bone, &c. But this is not surprising, as other glasses of the same shape and size will do the same: but the wonder is, that taking a shiver of flint of the size of a small pea, and letting it fall into the glass only from the height of three inches, in about two seconds the glass flies, and sometimes at the very moment of the shock; nay, a bit of flint no larger than a grain, dropped into several glasses successively, though it did not immediately break them, yet when set by, they all flew in less than three quarters of an hour. Some other bodies produce the same effect with flint; as sapphire, diamond, porcelain, hard tempered steel, also marbles such as boys play with, and likewise pearls.

These experiments were made before the Royal Society; and succeeded equally when the glasses were held in the hand, when they were rested on a pillow, put in water, or filled with water. It is also remarkable, that the glasses broke upon having their bottoms slightly rubbed with the finger, though some of them did not fly till half an hour after the rubbing. If the glasses are every where extremely thin, they do not break in these circumstances.

5
Attempts
to account
for it.

Some have pretended to account for these phenomena, by saying, that the bodies dropped into the vessels cause a concussion which is stronger than the cohesive force of the glass, and consequently that a rupture must ensue. But why does not a ball of iron, gold, silver, or copper, which are perhaps a thousand times heavier than the flint, produce the same effect? Is it because they are not elastic? But surely iron is more elastic than the end of one's finger.—Mr Euler has endeavoured to account for these appearances from his principles of percussion. He thinks that this experiment entirely overthrows the opinion of those who measure the force of percussion by the *vis viva*, or absolute apparent strength of the stroke. According to his principles, the great hardness and angular figure of the flint, which makes the space of contact with the glass extremely small, ought to cause an impression on the glass vastly greater than lead, or any other metal; and this may account for the flint's breaking the vessel, though the bullet, even falling from a considerable height, does no damage.—Hollow cups made of green bottle-glass, some of them three

inches thick at the bottom, were instantly broken by a shiver of flint, weighing about two grains, though they had resisted the shock of a musket-ball from the height of three feet.

That Mr Euler's theory cannot be conclusive more than the other, must appear evident from a very slight consideration. It is not by angular bodies alone that the glasses are broken. The marbles with which children play are round, and yet they have the same effect with the angular flint. Besides, if it was the mere force of percussion which broke the glasses, undoubtedly the fracture would always take place at the very instant of the stroke; but we have seen, that this did not happen sometimes till a very considerable space of time had elapsed. It is evident, therefore, that this effect is occasioned by the putting in motion some subtle fluid with which the substance of the glass is filled; and that the motions of this fluid, when once excited in a particular part of the glass, soon propagate themselves through the whole or greatest part of it, by which means the cohesive power becomes at last too weak to resist them. There can be little doubt that the fluid just now mentioned is that of electricity. It is known to exist in glass, in very great quantity; and it also is known to be capable of breaking glasses, even when annealed with the greatest care, if put into too violent a motion. Probably the cooling of glass hastily may make it more electric than is consistent with its cohesive power, so that it is broken by the least increase of motion in the electric fluid by friction or otherwise. This is evidently the case when it is broken by rubbing with the finger; but why it should also break by the mere contact of flint and the other bodies abovementioned, has not yet been satisfactorily accounted for.

6
Rotation of
glass-tubes
before a
fire.

A most remarkable phenomenon also is produced in glass tubes placed in certain circumstances. When these are laid before a fire in an horizontal position, having their extremities properly supported, they acquire a rotatory motion round their axis, and also a progressive motion towards the fire, even when their supports are declining from the fire, so that the tubes will move a little way uphill towards the fire. When the progressive motion of the tubes towards the fire is stopped by any obstacle, their rotation still continues. When the tubes are placed in a nearly upright posture, leaning to the right hand, the motion will be from east to west; but if they lean to the left hand, their motion will be from west to east; and the nearer they are placed to the perfectly upright posture, the less will the motion be either way.

If the tube is placed horizontally on a glass plane, the fragment, for instance, of coach window-glass, instead of moving towards the fire, it will move from it, and about its axis in a contrary direction to what it had done before; nay, it will recede from the fire, and move a little up-hill when the plane inclines towards the fire.—These experiments are recorded in the philosophical transactions †. They succeeded best with † No 476. §. 1. tubes about 26 or 22 inches long, which had in each end a pretty strong pin fixed in cork for an axis.

7
Attempts to account
for it.

The reason given for these phenomena, is the swelling of the tubes towards the fire by the heat, which is known to expand all bodies. For, say the adopters of this hypothesis, granting the existence of such a

Glasf.

swelling, gravity must pull the tube down when supported near its extremities, and a fresh part being exposed to the fire, it must also swell out and fall down, and so on.—But, without going farther in the explanation of this hypothesis, it may be here remarked, that the fundamental principle on which it proceeds is false: for though fire indeed makes bodies expand, it does not increase them in weight; and therefore the sides of the tube, though one of them is expanded by the fire, must still remain in *equilibrio*; and hence we must conclude, that the causes of these phenomena remain yet to be discovered.

4. Glasf is less dilatable by heat than metalline substances, and solid glasf-ticks are less dilatable than tubes. This was first discovered by Col. Roy, in making experiments in order to reduce barometers to a greater degree of exactness than hath hitherto been found practicable; and since his experiments were made, one of the tubes 18 inches long, being compared with a solid glasf-rod of the same length, the former was found by a pyrometer, to expand four times as much as the other, in a heat approaching to that of boiling oil.—On account of the general quality which glasf has of expanding less than metal, M. de Luc recommends it to be used in pendulums: and he says it has also this good quality, that its expansions are always equable, and proportioned to the degrees of heat; a quality which is not to be found in any other substance yet known.

5. Glasf appears to be more fit for the condensation of vapours than metallic substances. An open glasf filled with water, in the summer-time, will gather drops of water on the outside, just as far as the water in the inside reaches; and a person's breath blown on it, manifestly moistens it. Glasf also becomes moist with dew, when metals do not. See Dew.

6. A drinking-glasf partly filled with water, and rubbed on the brim with a wet finger, yields musical notes, higher or lower as the glasf is more or less full; and will make the liquor frisk and leap. See HARMONICA.

7. Glasf is possessed of very great electrical virtues. See ELECTRICITY, *passim*.

Materials for Making of GLASS. The materials whereof glasf is made, we have already mentioned to be salt and sand or stones. The salt here used, is procured from a sort of ashes, brought from the Levant, called *polverine*, or *rochetta*; which ashes are those of a sort of water-plant called *kali*, cut down in summer, dried in the sun, and burnt in heaps, either on the ground, or on iron gates; the ashes falling into a pit, grow into a hard mass, or stone, fit for use. It may also be procured from common kelp, or the ashes of the *fucus vesiculosus*. See Kelp, and Fucus in *The APPENDIX*.

To extract the salt, these ashes, or polverine, are powdered and sifted, then put into boiling water, and there kept till one third of the water be consumed; the whole being stirred up from time to time, that the ashes may incorporate with the fluid, and all its salts be extracted: then the vessel is filled up with new water, and boiled over again, till one half be consumed; what remains is a sort of lee, strongly impregnated with salt. This lee, boiled over again in fresh coppers, thickens in about twenty-four hours,

and shoots its salt; which is to be ladled out, as it shoots, into earthen pans, and thence into wooden vats to drain and dry. This done, it is grossly pounded, and thus put in a sort of oven, called *calcar*, to dry. It may be added, that there are other plants, besides *kali*, and *fucus*, which yield a salt fit for glasf: such are the common way-thistle, bramble, hops, wormwood, woad, tobacco, fern, and the whole leguminous tribe, as pease, beans, &c. In some kinds of glasf, however, litharge, common pearl-ashes, and nitre, are used in great quantity.

The sand or stone, called by the artists *tarso*, is the second ingredient in glasf, and that which gives it the body and firmness. These stones, *Agricola* observes, must be such as will fuse; and of these such as are white and transparent are best; so that crystal challenges the precedence of all others.

At Venice they chiefly use a sort of pebble, found in the river Tefino, resembling white marble, and called *cugolo*. Indeed Ant. Neri assures us, that all stones which will strike fire with steel, are fit to vitrify: but Dr Merret shews, that there are some exceptions from this rule. Flints are admirable; and when calcined, powdered, and searched, make a pure white crystalline metal: but the expence of preparing them makes the masters of our glasf-houses sparing of their use. Where proper stones cannot be so conveniently had, sand is used; which should be white, and small, and well washed, before it be applied: such is usually found in the mouths and sides of rivers. Our glasf-houses are furnished with a fine sand for crystal, from Maidstone; the same with that used for sand-boxes, and in scouring; and with a coarser for green glasf, from Woolwich. For crystal glasf, to 200 lb of tarso, pounded fine, they put 130 lb of salt of polverine; then mix them together, and put them into the *calcar*, a sort of reverberatory furnace, being first well heated. Here they remain baking, frying, and calcining, for five hours, during which the workman keeps mixing them with a rake, to make them incorporate: when taken out, the mixture is called *frit*, or *bolitto*.

It may be further observed, that glasf might be made by immediately melting the materials without thus calcining and making them frit; but the operation would be much more tedious.

A glasf much harder than any prepared in the common way may be made by means of borax, in the following manner. Take four ounces of borax, and an ounce of fine white sand, reduced to powder, and melt them together in a large close crucible set in a wind-furnace, keeping a strong fire for half an hour; then take out the crucible, and, when cold, break it; and there will be found at the bottom, a hard, pure glasf, capable of cutting common glasf almost like a diamond. This experiment duly varied, says Dr Shaw, may lead to some considerable improvements in the art of making glasf, enamels, and artificial gems. It shews us an expeditious method of making glasf without the use of fixed salts, which has generally been thought an essential ingredient in glasf, and which is the ingredient that gives common glasf its softness; and it is not yet known, whether calcined crystal, or other substances being added to this salt, instead of sand, it might not make a glasf approaching to the

Glasf.

Phil. Transf.
vol. lxvii.
P. 663.

Phil.
vol. lxviii.
P. 474.

8
Materials
for glasf.

* See *Salsola*.

9
Dr Shaw's
receipt for
very hard
glasf.

nature

Glaſs.

nature of a diamond.

Kinds of GLASS. Of theſe materials we have many ſorts of glaſs made, which may principally be diſtinguiſhed according to their beauty: as the cryſtal flint-glaſs, the cryſtal white-glaſs, the green-glaſs, and the bottle-glaſs. Again, theſe ſeveral ſorts are diſtinguiſhed by their ſeveral uſes: as plate or coach glaſſes, looking-glaſſes, optic-glaſſes, &c. which are made of the firſt fort. The ſecond fort includes crown-glaſs, toys, phials, drinking glaſſes, &c. The third fort is well known by its colour, and the ſecond by its form.

Balar-coloured GLASS is made thus: Put into a pot cryſtal frit, thrice waſhed in water; tinge this with manganese prepared into a clear purple: to this add alumen cativum ſifted fine in ſmall quantities, and at ſeveral times; this will make the glaſs grow yellowiſh, and a little reddiſh, but not blackiſh, and always diſſipates the manganese. The laſt time you add manganese, give no more of the alumen cativum, unleſs the colour be too full. Thus will the glaſs be exactly of the colour of the balas-ruby.

Red GLASS. A blood-red glaſs may be made in the following manner: Put fix pounds of glaſs of lead, and ten pounds of common glaſs, into a pot glazed with white glaſs: when the whole is boiled and refined, add, by ſmall quantities, and at ſmall diſtances of time, copper calcined to a redneſs, as much as, on repeated proofs, is found ſufficient: then add tartar in powder by ſmall quantities at a time, till the glaſs is become as red as blood; and continue adding one or other of the ingredients till the colour is quite perfect.

A much finer red, however, may be communicated to glaſs by means of gold, of which Dr Lewis gives the following account. "The tinging of glaſs and enamels by preparations of gold appears to have been firſt attempted about the beginning of the laſt century. Libavius, whoſe works compoſe a valuable body of the chemical knowledge of his own time, conjectures, in one of his traſacts entitled *Alchymia*, printed in 1606, that the colour of the ruby proceeds from gold, and that gold diſſolved and brought to redneſs might be made to communicate a like colour to facitious gems or glaſs: Neri, in his *Art of Glaſs* dated 1611, gives a proceſs on this principle, which he ſays was found to ſucceed: he directs the gold to be diſſolved in aqua regia, the menſtrum to be evaporated or drawn off by diſtillation, more aqua regia added, and the abſtraction repeated five or fix times: the remaining matter is to be calcined till it becomes purple, and then mixed with a proper quantity of the ſineſt white or cryſtal glaſs. But though this proceſs may be ſuppoſed to have ſometimes proved ſucceſſful, it doubtleſs very often miſcarried; inſomuch that the introduction of this deſirable colour into the glaſs was very little known for many years after.

"Glauber, in the ſecond part of his *Philophical Furnaces* published in 1648, gives another method of producing a red colour by gold in a matter which is of the vitreous kind, though not perfect glaſs. When powdered flint or ſand is well ground with four times its weight of fix alkaline ſalt, the mixture melts in a moderately ſtrong fire, and when cold looks like glaſs, but on account of its over-proportion of alka-

line ſalt it runs into a liquid ſtate on being expoſed to the air: on adding this liquor to ſolution of gold in aqua regia, the acid, which held the gold diſſolved, unites with the alkali which held the flint diſſolved, and the gold and flint precipitate together in form of a yellow powder, which by calcination becomes purple: this powder being mixed with three or four times its weight of the alkaline ſolution of flint, the mixture dried, and kept melted in a ſtrong fire for an hour, a maſs is obtained, of a transparent ruby colour, and of a vitreous appearance; though ſtill ſoluble in water, or by the moiſture of the air, on account of the redundance of ſalt.

"Boyle, in his treatiſe on the Porofity of Bodies, and in the appendix to his *Sceptical Chemiſt* published in 1680, mentions an experiment, in which a like colour was introduced into glaſs without fuſion. A mixture of gold and mercury having been kept in diſſolution for ſome months, the fire was at laſt immoderately increaſed, inſomuch that the glaſs burſt with a violent exploſion: the lower part of the glaſs was found tinged throughout of a transparent red colour, which ſeemed, he ſays, to emulate that of a not common ruby.

"About the ſame time Caſſius diſcovered the precipitation of gold by tin, and that glaſs might be tinged of a ruby colour by melting it with this precipitate. I can give no further account of his experiments, having never had the good fortune to meet with his treatiſe.

"The proceſs was ſoon after brought to perfection by Kunckel, who ſays he prepared the ruby glaſs in large quantity, and ſold it for about forty ſhillings an ounce; and that he made a chalice of it for the elector of Cologn, weighing no leſs than 24 pounds, a full inch thick, and of an uniform fine colour throughout. He has nowhere communicated the proceſs he followed, but ſome uſeful obſervations relating to it are diſperſed through his writings: he ſays, that one part of the precipitate by tin is ſufficient to give a ruby colour to twelve hundred and eighty parts of glaſs, and a ſenſible redneſs to upwards of nineteen hundred parts: that the ſucceſs is by no means conſtant, and that, after long practice, he ſtill frequently failed: that oftentimes the glaſs comes out of the fire colourleſs as cryſtal, and receives its ruby colour on being afterwards expoſed to a ſmoky flame, inſomuch that he imagines the diſcovery of the ruby glaſs did not ariſe from ſimply melting the gold precipitate with glaſs, but from the ſubſequent ſoftening and working of the glaſs in the flame of a lamp, in the uſe of which Caſſius was very converſant: that the addition of nitre and ſal ammoniac calls forth the colour, and that the colour produced by ſal ammoniac is more beautiful than that by nitre, but quickly diſappears on a continuance of the fire.

"Orſchal, in a treatiſe entitled *ſol ſine veſte*, gives a proceſs, by which he ſays he obtained a very fine ruby. He directs the purple precipitate, made by tin, to be ground with fix times its quantity of Venetian glaſs in a very fine powder, and this compound to be exquisitely mingled with the frit or vitreous compoſition to be tinged: his frit conſiſts of equal parts of borax, nitre, and fix alkaline ſalt, and four times as much calcined ſlint as of each of the ſalts; but in

Glaſs.

10
Different
kinds of
glaſs.

11
Dr Lewis's
experiments for
tinging
glaſs red.
Phil. Com.
of Arts.

Glas.

what proportion the gold precipitate is to be mixed with the fritt, and in what manner the fusion is to be performed, he does not mention. He reports that he had found the muddy matter, obtained in polishing gold by a pumice stone, to impart likewise a ruby colour to glasses.

" Grummet, who had been operator to Kunckel in making the red glass, published a tract in opposition both to him and Orfclal, under the title of *Sol non sine vesle*; in which he observes, that the furnace ought to be so constructed, that the operator may have full liberty of examining the glass in the fire, and of removing it as soon as it appears to have acquired the proper colour: he says the enamellers obtain a ruby colour, by melting, with a large proportion of Venice glass, the brownish powder precipitated from solution of gold in aqua regia by fixt alkaline salts. But he imagines that the gold is nowise concerned in the production of the colour. Venice glass, and most of the finer colourless kinds of glass, have an addition of manganese, without which it would be very difficult to render them perfectly void of colour: the manganese communicates at first a purplish hue, which on continuing the fire disappears, and at the same time suppresses or discharges any other tinge that the glass may be impregnated with: the addition of a little nitre revives the purplish colour of the manganese; and Grummet is of opinion that the colour with which glass becomes tinged, by the admixture of preparations of gold, is no other than that of the manganese extricated by the nitrous salt which the gold has retained in its precipitation. He affirms, that the same purplish red colour will be obtained on melting Venice glass with an eighth part of nitre, without any gold; that in a hundred repetitions of this experiment, it scarcely fails once; and that neither nitre nor the gold-precipitate were found to give any thing of the admired colour to those kinds of glass which have no manganese in their composition.

" The colours which manganese imparts to glass, it belongs not to this place to examine: but that precipitates of gold will communicate, in certain circumstances, a purplish red colour, I have several times experienced; having myself tinged of this colour fritts composed of calcined flint, nitre and borax, without the addition of manganese or of glasses containing it. Though gold, dissolved in common aqua regia, exhibits its own yellow colour; yet, when the menstruum is separated by fire to a certain point, or when the gold is precipitated by tin, or when it is precipitated by alkaline salts and afterwards moderately heated, or when gold is barely divided by mechanical means into subtile powder, and exposed for some time, in mixture with earthy bodies, to a slight heat, it assumes, in different circumstances, a violet colour, a purple, or a red verging to purple: in a strong fire, these colours vanish, and the gold melts into a mass of its original appearance. All these colours I have introduced into glass by preparations of gold; and I have found them to be nearly as perishable in the fire when the coloured gold-powder was thus diffused through the glass, as when exposed to the fire by itself: when the fire was raised to any great degree, and the glass made to flow thin, there was generally a button of revived gold collected at the bottom.

Glas.

" A solution of gold in aqua regia being inspissated to dryness in the bottom of a Florence flask, and the heat further increased till the gold resumed its proper colour, the lower part of the glass was by this simple process tinged purplish: pieces of it being exposed to the flame of a lamp, they became in some parts violet coloured, in some of a bright purple, and in others purplish red; and the parts which in one position looked violet or purplish, in another appeared red.

" A colour nearly of the same kind is impressed on glass by gold-leaf in some electrical experiments; a fact which we are obliged to Mr Franklin for the first knowledge of. A narrow strip of gold-leaf being placed between two slips of glass, with both the ends hanging out a little, and the glass well tied round with silk thread, a strong electrical explosion is made to pass through the gold-leaf. On examining the glass, the gold-leaf, he observes, will be found missing in several places, and instead of it a reddish stain on both the glasses, exactly similar on both in the minutest stroke, though sometimes spread a little wider than the breadth of the leaf: the stain appears to have penetrated into the substance of the glass, so as to be protected by it from the action of aqua regia. I have had this experiment several times repeated with plate-glass; and found it tinged, as above described, in some parts violet, in some purplish, and in some reddish: the colours could not be scraped off, and resisted aqua regia and spirit of salt. If the electric explosion is made very strong, the glass commonly flies in pieces, with such force, that it is necessary for the operator to have his face screened from them.

" The preparation of gold which has been principally recommended for tinging glass is Cassius's precipitate by solution of tin. To obtain this precipitate of the due colour, a good deal of care is necessary both in dissolving the tin and in diluting the solutions. A mixture of two parts of aqua fortis and one of spirit of salt, is supposed to be the best menstruum for the tin: into this mixture some fine block-tin, granulated, is to be let fall, grain by grain, waiting till one grain is dissolved before another is dropt in, that the dissolution may go on slowly, without any heat or discharge of fumes. The gold is dissolved in common aqua regia; and a few drops of this solution being mixed with some ounces of pure water, as many drops of the solution of tin are added. If the mixture changes immediately to a clear bright purplish red colour, the due degree of dilution has been hit; if the colour appears dull, a greater quantity of water must be added for the rest of the solutions. After the mixture has deposited its red matter, and become clear, a little more of the tin-solution is to be dropt in, for discovering, and precipitating, any gold that may still remain in it: the liquor being then poured off, the precipitate is washed and dried.

" Kunckel mentions another purple gold-powder, made nearly like that of Neri already mentioned, by inspissating solution of gold to dryness, abstracting from it fresh aqua regia three or four times till the matter looks almost like oil, then precipitating with strong alkaline ley, and washing the precipitate with water. By dissolving this powder in spirit of salt, and precipitating again, it becomes, he says, extremely

ly

Glaifs. ly fair, and in this state he directs it to be mixed with a due proportion of Venice glass.

“ Hellot describes a preparation which in mixture with Venice glass was found to give a beautiful purple enamel. Equal parts of solution of gold, and of solution of zinc in aqua regia, are mixed together; and a volatile spirit, prepared from sal ammoniac by quicklime, added to the mixture in sufficient quantity to precipitate the two metals. The precipitate is to be gradually heated, till it acquires a violet colour: it does not fulminate, making only a slight dull decrepitation without any of its particles flying about.

“ Though a purple, or a red colour approaching to that of the ruby, may by the foregoing means be baked upon glass or enamels, and introduced into the mass by fusion, the way of equally diffusing such a colour through a quantity of fluid glass is still a secret.

“ I was once, many years ago, fortunate enough to succeed, at a glass-house, in a small pot of glass, of which a salver was blown of a fine ruby red: the tinging matter was the precipitate of gold by tin; the particulars of the process cannot now be recollected. I have since tried the remainder of the same preparation, with common flint glass, with green glass, with various frits composed of flint, borax, pure fixt alkaline salt, nitre, sal ammoniac. When flint was used, it was several times made red-hot, and quenched in water, to render it more easily pulverable: both the flint and glasses were powdered in an iron mortar, and the powders well washed with diluted oil of vitriol, to extract such particles of iron as they might have worn off in the trituration; the gold precipitate was ground with the other ingredients, in agate or glass mortars; its proportion was varied from an eighth part to an eight hundredth of the vitreous materials; and the fire was continued, in a wind furnace, from six to thirty hours. All the glasses came out considerably coloured; some of a deep dusky yellow; some of a fine pale transparent yellow; some of a brown colour, greatly resembling that which the glass mentioned below acquired under a muffle; some appeared yellowish or brownish when looked down upon, and of a purple-violet or reddish purple when held between the eye and the light: some had specks and veins of a fine red; no one was either red or purple throughout. Several of these glasses were melted again and again, by themselves, and with the addition of more vitreous matter: some were worked in the flame of a lamp: some were laid in a mixture of powdered charcoal and foot, and made red-hot in a close crucible; and others being laid in the same manner, the fire was increased till they melted. The colours were by these means altered; but did not become uniform, or more approaching to the ruby colour than before: some pieces, which had at first very considerable specks of a ruby lustre, lost them on a repetition of the fusion.

“ At the same time that these experiments were tried, the same kinds of vitreous compositions, mixed with different metallic preparations, were exposed to the fire in different parts of the same furnace, and were all found to receive beautiful and uniform colours. To what cause the miscarriage of those with gold was owing; whether the success, in regard to this metal,

is influenced by the quantity of the matter, by the unsteadiness of the heat in a small furnace, by the fusibility of the vitreous composition, by the metallic matter being ground with the ingredients before their exposure to the fire, or added to them in fusion, by the continuance of the fire, by the fluid matter being kept unmoved or stirred with an iron rod, by the crucible being covered or open, or other like circumstances; or whether the admixture of a little manganese, though gold will certainly give a ruby colour without it, does not contribute to secure the success; I have not yet discovered. The proportion of the gold precipitate to the vitreous matter is perhaps of principal importance. Solution of gold, as we have seen already, produces no redness with tin unless diluted with a very large quantity of water, in which circumstance the whole mixture acquires that beautiful colour which we here want to transfer from the watery fluid into fluid glass. It should seem, therefore, that the quantity of gold precipitate, for communicating the admired colour to a certain volume of glass, ought to be the same with that which communicated a like colour to an equal volume of water in the precipitation: a quantity extremely minute, and much less than that employed in any of my experiments.

“ I have lately been favoured with some pieces of glass, in greatest part colourless, with one or two large red spots, several small streaks of violet, and some of a light brownish yellow. The person from whom I received them informs me, “ that he had found, that in a heat not very strong, under a muffle, the glass becomes of an opaque brown, and, if then polished, appears variegated like a fine pebble.” I exposed a colourless piece to the flame of a lamp, impelled by a blow-pipe; and on working it about, sometimes in the smoke, and sometimes in the flame, found it change to a true ruby-red, perfectly transparent, and free from veins of any other colour. Another piece, kept for two hours under a close muffle, in such a heat as made it just soft enough to bend and receive an impression, became on the surface green, brown, and pale yellow in different parts, greatly resembling the coat of some pebbles: in this state, looked through against the sun, it appeared of a beautiful ruby-colour, and on breaking it, the internal part was found throughout of an uniform dark-red when looked down upon, and of the ruby-red when placed between the eye and the light. A large piece being continued under the muffle for four hours, its figure was found scarcely altered, the coat was much thicker, and beautifully veined with various colours, which were all lost in a glorious red when the piece was viewed between the light.

“ All I have been able to learn in regard to the preparation of this glass is, that the quantity made at once is about six cwt.; that the tinging matter is mixed with the vitreous materials before they are put into the melting-pot, the mixture being brought to the glass-house in tubs; that the matter is not stirred in fusion; and that it is kept no longer in the fire than is necessary for perfecting the glass, which, as soon as fine, is cast into a kind of bricks. Some imagine that this glass has no mixture of calx of lead, of which a large proportion is used in the composition of the

Glaifs.

en frame, with truffles for the convenience of moving to the annealing furnace; into which, strewed with sand, the new plate is shoved, where it will harden in about ten days. After this, the glass needs only to be ground, polished, and foliated for use.

Grinding and Polishing of Plate-Glass. Glass is made transparent by fire; but it receives its lustre by the skill and labour of the grinder and polisher, the former of whom takes it rough out of the hands of the maker.

In order to grind plate-glass, they lay it horizontally upon a flat stone table (fig. 3.) made of a very fine-grained free-stone: and for its greater security they plaster it down with lime or stucco; for otherwise the force of the workmen, or the motion of the wheel with which they grind it, would move it about.

This stone table is supported by a strong frame A, made of wood, with a ledge quite round its edges, rising about two inches higher than the glass. Upon this glass to be ground, is laid another rough glass not above half so big, and so loose as to slide upon it; but cemented to a wooden plank, to guard it from the injury it must otherwise receive from the scraping of the wheel to which this plank is fastened, and from the weights laid upon it to promote the grinding or triture of the glasses. The whole is covered with a wheel, B, made of hard light wood, about six inches in diameter; by pulling of which backwards and forwards alternately, and sometimes turning it round, the workmen, who always stand opposite to each other, produce a constant attrition between the two glasses, and bring them to what degree of smoothness they please, by first pouring in water and coarse sand; after that, a finer sort of sand, as the work advanceth, till at last they must pour in the powder of smalt. As the upper or incumbent glass polishes and grows smoother, it must be taken away, and another from time to time put in its place.

This engine is called a *mill* by the artists, and is used only in the largest-sized glasses; for in the grinding of the lesser glasses, they are content to work without a wheel, and to have only four wooden handles fastened to the four corners of the stone which loads the upper plank, by which they work it about.

When the grinder has done his part, who finds it very difficult to bring the glass to an exact plainness, it is turned over to the polisher; who, with the fine powder of tripoli-stone, or emery, brings it to a perfect evenness and lustre. The instrument made use of in this branch is a board, c, furnished with a felt, and a small roller, which the workman moves by means of a double handle at both ends. The artist in working this roller, is assisted with a wooden hoop or spring, to the end of which it is fixed: for the spring, by constantly bringing the roller back to the same points, facilitates the action of the workman's arm.

Painting in Glass. The ancient manner of painting in glass was very simple: it consisted in the mere arrangement of pieces of glass of different colours in some sort of symmetry, and constituted what is now called *Mosaic work*. See *MOsaic*.

In process of time they came to attempt more regular designs, and also to represent figures heightened with all their shades: yet they proceeded no farther

than the contours of the figures in black with water-colours, and hatching the draperies after the same manner on glasses of the colour of the object they designed to paint. For the carnation, they used glass of a bright red colour; and upon this they drew the principal lineaments of the face, &c. with black.

But in time, the taste for this sort of painting improving considerably, and the art being found applicable to the adorning of churches, basilics, &c. they found out means of incorporating the colours in the glass itself, by heating them in the fire to a proper degree; having first laid on the colours.

This art, however, has frequently met with much interruption, and sometimes been almost totally lost; of which Mr Walpole gives us the following account, in his *Anecdotes of Painting in England*.

"The first interruption given to it was by the reformation, which banished the art out of churches; yet it was in some measure kept up in the escutcheons of the nobility and gentry, in the windows of their seats. Towards the end of queen Elizabeth's reign it was omitted even there; yet the practice did not entirely cease. The chapel of our Lady at Warwick was ornamented anew by Robert Dudley earl of Leicester, and his countess, and the cipher of the glass-painter's name yet remains, with the date 1574: and in some of the chapels at Oxford the art again appears, dating itself in 1622, by the hand of no contemptible master.

"I could supply even this gap of 48 years by many dates on Flemish glass; but nobody ever supposed that the secret was lost so early as the reign of James I. and that it has not perished since, will be evident from the following series reaching to the present hour.

"The portraits in the windows of the library at All Souls, Oxford. In the chapel at Queen's college there are twelve windows dated 1518. P. C. a cipher on the painted glass in the chapel at Warwick, 1574. The windows at Wadham-college; the drawing pretty good, and the colours fine, by Bernard Van Linde, 1622. In the chapel at Lincoln's-Inn, a window, with the name of *Bernard*, 1623. This was probably the preceding Van Linde. In the church of St Leonard, Shoreditch, two windows by Baptista Sutton, 1634. The windows in the chapel at University-college, Hen. Giles *pinxit*, 1637. At Christ-church, Isaac Oliver, aged 84, 1700. Window in Merton-chapel, William Price, 1700. Windows at Queen's New-college, and Maudlin, by William Price, the son, now living, whose colours are fine, whose drawing is good, and whose taste in ornaments and mosaic is far superior to any of his predecessors; is equal to the antique, to the good Italian masters, and only surpassed by his own singular modesty.

"It may not be unwelcome to the curious reader to see some anecdotes of the revival of taste for painted glass in England. Price, as we have said, was the only painter in that style for many years in England. Afterwards one Rowell, a plumber at Reading, did some things, particularly for the late Henry earl of Pembroke; but Rowell's colours soon vanished. At last he found out a very durable and beautiful red; but he died in a year or two, and the secret with him. A man at Birmingham began the same art in 1756 or 1757, and fitted up a window for lord Lyttelton, in the church of Hagley; but soon broke. A little after him,

Glas. him, one Peckitt at York began the same business, and has made good proficiency. A few lovers of that art collected some dispersed panes from ancient buildings, particularly the late lord Cobham, who erected a Gothic temple at Stowe, and filled it with arms of the old nobility, &c. About the year 1753, one Asciotti, an Italian, who had married a Flemish woman, brought a parcel of painted glass from Flanders, and sold it for a few guineas to the honourable Mr Bateman, of Old Windsor. Upon that I sent Asciotti again to Flanders, who brought me 450 pieces, for which, including the expence of his journey, I paid him 36 guineas. His wife made more journeys for the same purpose; and sold her cargoes to one Palmer, a glazier in St Martin's-lane, who immediately raised the price to one, two, or five guineas for a single piece, and fitted up entire windows with them, and with mosaics of plain glass of different colours. In 1761, Paterfon, an auctioneer at Essex-house in the Strand, exhibited the two first auctions of painted glass, imported in like manner from Flanders. All this manufacture consisted in rounds of scripture-stories, stained in black and yellow, or in small figures of black and white; birds and flowers in colours, and Flemish coats of arms."

The colours used in painting or staining of glass are very different from those used in painting either in water or oil colours.

For black, take scales of iron, one ounce; scales of copper, one ounce; jet, half an ounce: reduce them to powder, and mix them.* For blue, take powder of blue, one pound; sal nitre, half a pound; mix them and grind them well together. For carnation, take red chalk, eight ounces; iron scales, and litharge of silver, of each two ounces; gum arabic, half an ounce; dissolve in water; grind all together for half an hour as stiff as you can; then put it in a glass and stir it well, and let it stand to settle fourteen days. For green, take red-lead, one pound; scales of copper, one pound; and flint, five pounds: divide them into three parts; and add to them as much sal nitre; put them into a crucible, and melt them with a strong fire; and when it is cold, powder it, and grind it on a porphyry. For gold colour, take silver, an ounce; antimony, half an ounce; melt them in a crucible; then pound the mass to powder; and grind it on a copper plate; add to it yellow oker, or brick-dust calcined again, fifteen ounces; and grind them well together with water. For purple, take minium, one pound; brown stone, one pound; white flint, five pounds: divide them into three parts, and add to them as much sal nitre as one of the parts; calcine, melt, and grind it as you did the green. For red, take jet, four ounces; litharge of silver, two ounces; red chalk, one ounce; powder them fine, and mix them. For white, take jet, two parts; white flint, ground on a glass very fine, one part; mix them. For yellow, take Spanish brown, ten parts; leaf-silver, one part; antimony, half a part; put all into a crucible, and calcine them well.

In the windows of ancient churches, &c. there are to be seen the most beautiful and vivid colours imaginable, which far exceed any of those used by the moderns, not so much because the secret of making those colours is entirely lost, as that the moderns will not

go to the charge of them, nor be at the necessary pains, by reason that this sort of painting is not now so much in esteem as formerly. Those beautiful works which were made in the glass-houses were of two kinds.

In some, the colour was diffused through the whole substance of the glass. In others, which were the more common, the colour was only on one side, scarce penetrating within the substance above one third of a line; though this was more or less according to the nature of the colour, the yellow being always found to enter the deepest. These last, though not so strong and beautiful as the former, were of more advantage to the workmen, by reason that on the same glass, though already coloured, they could shew other kind of colours where there was occasion to embroider draperies, enrich them with foliages, or represent other ornaments of gold, silver, &c.

In order to this, they made use of emery, grinding or wearing down the surface of the glass, till such time as they were got through the colour to the clear glass. This done, they applied the proper colours on the other side of the glass. By these means, the new colours were hindered from running and mixing with the former, when they exposed the glasses to the fire, as will appear hereafter.

When indeed the ornaments were to appear white, the glass was only bared of its colour with emery, without tinging the place with any colour at all; and this was the manner by which they wrought their lights, and heightnings, on all kinds of colour.

The first thing to be done, in order to paint or stain glass, in the modern way, is to design, and even colour the whole subject on paper. Then they choose such pieces of glass as are clear, even, and smooth, and proper to receive the several parts; and proceed to distribute the design itself, or papers it is drawn on, into pieces suitable to those of the glass; always taking care that the glasses may join in the contours of the figures and the folds of the draperies; that the carnations, and other finer parts, may not be impaired by the lead with which the pieces are to be joined together. The distribution being made, they mark all the glasses as well as papers, that they may be known again: which done, applying every part of the design upon the glass intended for it, they copy, or transfer, the design upon this glass with the black colour diluted in gum-water, by tracing and following all the lines and strokes as they appear through the glass with the point of a pencil.

When these strokes are well dried, which will happen in about two days, the work being only in black and white, they give a slight wash over with urine, gum arabic, and a little black; and repeat it several times, according as the shades are desired to be heightened; with this precaution, never to apply a new wash till the former is sufficiently dried.

This done, the lights and risings are given by rubbing off the colour in the respective places with a wooden point, or the handle of the pencil.

As to the other colours above-mentioned, they are used with gum-water, much as in painting in miniature; taking care to apply them lightly, for fear of effacing the outlines of the design; or even, for the greater security, to apply them on the other side; especially yellow,

Glaſs,
Glaſton-
bury.

Glaſton-
bury
Glaucoma.

low, which is very pernicious to the other colours, by blending therewith. And here too, as in pieces of black and white, particular regard muſt always be had not to lay colour on colour, or lay on a new lay, till ſuch time as the former are well dried.

It may be added, that the yellow is the only colour that penetrates through the glaſs, and incorporates therewith by the fire; the reſt, and particularly the blue, which is very difficult to uſe, remaining on the ſurface, or at leaſt entering very little. When the painting of all the pieces is finiſhed, they are carried to the furnace, or oven, to anneal, or bake the colours.

The furnace here uſed is ſmall, built of brick, from 18 to 30 inches ſquare. At fix inches from the bottom is an aperture to put in the fuel, and maintain the fire. Over this aperture is a grate, made of three ſquare bars of iron, which traſverſe the furnace, and divide it into two parts. Two inches above this partition, is another little aperture, through which they take out pieces to examine how the coction goes forward. On the grate is placed a ſquare earthen pan, fix or ſeven inches deep, and five or ſix inches leſs every way than the perimeter of the furnace. On the one ſide hereof is a little aperture, through which to make trials, placed directly oppoſite to that of the furnaces deſtined for the ſame end. In this pan are the pieces of glaſs to be placed, in the following manner: Firſt, the bottom of the pan is covered with three ſtrata, or layers, of quicklime pulveriſed; theſe ſtrata being ſeparated by two others of old broken glaſs, the deſign whereof is to ſecure the painted glaſs from the too intense heat of the fire. This done, the glaſſes are laid horizontally on the laſt or uppermoſt layer of lime.

The firſt row of glaſs they cover over with a layer of the ſame powder, an inch deep; and over this they lay another range of glaſſes, and thus alternately till the pan is quite full; taking care that the whole heap always end with a layer of the lime-powder.

The pan being thus prepared, they cover up the furnace with tiles, on a ſquare table of earthen ware, cloſely luted all round; only leaving five little apertures, one at each corner, and another in the middle, to ſerve as chimneys. Things thus diſpoſed, there remains nothing but to give the fire to the work. The fire for the firſt two hours muſt be very moderate, and muſt be increaſed in proportion as the coction advances, for the ſpace of ten or twelve hours; in which time it is uſually completed. At laſt the fire, which at firſt was charcoal, is to be of dry wood, ſo that the flame covers the whole pan, and even iſſues out at the chimneys.

During the laſt hours, they make eſſays, from time to time, by taking out pieces laid for the purpoſe through the little aperture of the furnace and pan, to ſee whether the yellow be perfect, and the other colours in good order. When the annealing is thought ſufficient, they proceed with great haſte to extinguiſh the fire, which otherwiſe would ſoon burn the colours, and break the glaſſes.

GLASS of Antimony. See CHEMISTRY, n° 454.

GLASS of Lead. See GLAZING.

GLASTONBURY, a town of Somerſetſhire in England; ſeated in W. Lon. 2. 46. N. Lat. 51. 15. — It is noted for a famous abbey, ſome magnificent

ruins of which are ſtill remaining; but they are every day diminiſhing for the ſake of the ſtones. However, the curious ſtructure called the *Abbot's kitchen* is ſtill pretty entire, and is of a very unuſual contrivance. The monks pretend that it was the reſidence of Joſeph of Arimathea, and of St Patrick; but for this aſſertion they produce no good authority. The king of the Weſt Saxons erected a church here, which he and the ſucceeding kings enriched to ſuch a degree, that the abbot lived like a prince, had the title of *lord*, and ſat among the barons in parliament; and no perſon, not even a biſhop or prince, durſt ſet foot on the iſle of Avalon, in which the abbey ſtands, without his leave. The revenue of the abbey was above 40,000 l. per ann. beſides ſeven parks well ſtocked with deer. The laſt abbot, (Richard Whiting,) who had 100 monks, and 300 domeſtics, was hanged in his pontificals, with two of his monks, on the Tor, a high hill in the neighbourhood, for reſuſing to take the oath of ſupremacy to Henry VIII. and ſurrender his abſeiy when required. Edgar and many other Saxon kings were buried here; and, as ſome will have it, Arthur the Britiſh king.—The ſtory of the Glaſtonbury thorn, and of its budding always upon Chriſtmas-day, is well known: however, that circumſtance is falſe; though, if the winter is mild, it always buds about the latter end of December, but later if the weather is fevere.

GLATZ, a handſome and ſtrong town of Bohemia, and capital of a county of the ſame name. It is ſeated on the river Neiſſe; and* has ſtrong fortifications, with a caſtle built upon a mountain. The county was ceded to the king of Pruſſia by the queen of Hungary in 1742; and is about 45 miles in length, and 25 in breadth. It has mines of pit-coal, ſilver, and iron; good quarries, plenty of cattle, and fine ſprings of mineral water. The town is ſituated in E. Lon. 15. 16. N. Lat. 50. 25.

GLAUBER (John Rhodolphus), a celebrated German chemiſt, who flouriſhed about the year 1646. He wrote a great number of different treatiſes on chemiſtry, ſome of which have been tranſlated into Latin and French. All his works have been collected into one volume, entitled, *Glauberus concentratus*, which has been tranſlated into Engliſh, and was printed at London, in folio, in 1689.

GLAUBER's Salt. See CHEMISTRY, n° 124.

GLAUCUS, a marine god, or deity of the ſea. There are a great many fabulous accounts of this divinity: but the poetical hiſtory of him is, that, before his deſecation, he was a fiſherman of the town of Anthedon, who, having one day taken a conſiderable number of fiſhes, which he laid upon the bank, on a ſudden perceived, that theſe fiſhes, having touched a kind of herb that grew on the ſhore, received new ſtrength, and leaped again into the ſea: upon the ſight of which extraordinary accident, he was tempted to taſte of the herb himſelf, and preſently leaped into the ſea after them, where he was metamorphoſed into a Triton, and became one of the ſea-gods.

GLAUCOMA, or GLAUCOSIS, from γλαυκος, a ſky-blue colour. Mr Sharp, in his *Operations of Surgery*, p. 158—163, ſays, that the *glaucoma* of the ancient Greeks is the *ſuſſio* of the Latins, and the *cataraſt*.

Glucos
||
Glazing.Glazing,
Gleaning.

cataract of the present times. See (Index subjoined to) MEDICINE and SURGERY. Mr St Yves says, it is a *cataract* accompanied with a *gutta serena*; according to which nothing need be added, except that, in such a case, the operation and all other means are ineffectual, except to ease pain, and to mend the figure of the eye.

GLAUCUS, in ichthyology. See *SQUALUS*.

GLAZIER, an artificer who works in glass.—The principal part of a glazier's business consists in fitting panes of glass to the sashes and window-frames of houses, pictures, &c. and in cleaning the same.

GLAZING, the crusting over earthen ware by a vitreous substance, the basis of which is lead.

For making a pure glass of lead, the following receipt will be found to answer: Put a large quantity of lead into a potter's kiln, and keep it in a state of fusion with a moderate fire, till it is calcined to a grey loose powder; then spread it in the kiln, and give it a greater heat, continually stirring it to keep it from running into lumps. Continue this for several hours, till the powder becomes of a fair yellow; then take it out and sift it fine. This is called *calcined lead*.—Take of this calcined lead, 15 pounds; and crystalline or other frit, 12 pounds: mix these as well as possible together; put them into a pot, and set them in a furnace for 10 hours; then cast the whole, which will now be perfectly melted, into water; separate the loose lead from it, and return the metal into it; and after standing in fusion 12 hours more, it will be fit for use.

The workers of common earthen ware, however, are not at the trouble of thus previously making a pure glass of lead. Their usual composition for glazing their ware is formed of sand, wood-ashes, lead-ashes, and salt. The ware, after being turned on the wheel, and dried in the open air, is covered over with this composition by means of a brush; and when set in the furnace the violent heat soon reduces it to a perfect glass, covering the whole internal and external surface of the vessel.

The various colours for glazing are the same with those for tinging glass, which we have already described. A black colour is given with manganese or iron. The proportions, however, are not exactly ascertained, nor are there any receipts published concerning these things on which we can much depend. In the Philosophical Transactions we have the following receipt for a fine gold-coloured glazing, communicated to the Royal Society by Mr Heinhus of Petersburg. Take of litharge three parts, of sand or calcined flint one part; mix these very well together, then run them into a yellow glass with a strong fire. Pound this glass, and moisten it when in subtile powder with a well-saturated solution of silver, which make into a paste. Put this paste into a crucible, and cover it. Give at first a gentle degree of fire, then increase and continue it till you have a perfect glass which will be green. Pound this glass again, and reduce it to a fine powder: moisten this powder with some beer, so that by means of an hair-pencil you may apply it upon the vessels. Those that are painted or covered over with this glazing must be first well heated, then put under a muffle; and as soon as the glass runs you must smoke them, and take out the vessels. This prepa-

ration owes its colour to the silver in it; the precipitates of which, spread upon a glass plate, have the property of staining it yellow by ignition, without fusion. When used in glazing vessels, however, they must be held over the smoke of burning vegetables, in order to call forth the beautiful colour.

A red or green tinge may be given to glazings by means of copper. The red colour appears first; but by a continuation of the fire, it is changed into a green. The finest red colour, however, that can be given to glazings, is that prepared from the solution of gold in aqua regia, as mentioned under the article GLASS.—The finest blue is always given by means of zaffre or smalt. A purplish colour, as well as a brown or black, may also be given by manganese; but a mixture of the materials for red and blue will undoubtedly produce the finest colour. The colouring materials for glazings, therefore, in short are the following.

Red—Gold or copper.

Yellow—Silver, iron.

Green—Copper.

Blue—Zaffre or smalt.

Black—Manganese.

White—Calc of tin.

Each of these materials mixed up in a proper quantity with any composition that readily vitrifies, will form a glazing of the desired colour upon any kind of earthen ware. The proportions in which they are to be used may easily be determined by a few trials.—Stone ware is glazed by another method, viz. the vitrification of a small part of the substance of the ware itself, by the fumes of salt thrown into the furnace when the vessels are intensely heated. See STONE WARE.—The application of different colours to it, however, is equally easy with the former.

The Romans had a method of glazing their earthen vessels, which in many respects appears to have been superior to ours. The common brown glazing easily scales off, cracks, and in a short time becomes disagreeable to the eye. Besides, it is very easily destroyed by acids; nor can vessels glazed in this manner be even employed to hold water, without part of it oozing through their pores. Lead is also very destructive to the human body; and if acids are unwarily put into vessels glazed with lead, the liquors will receive a very dangerous impregnation from the metal. The Roman glazing, which is yet to be seen upon urns dug up in several places, appears to have been made of some kind of varnish; and Pliny gives us a hint that it was made of bitumen. He tells us that it never lost its beauty, and that at length it became customary to glaze over statues in this manner. As this varnish sunk deep into the substance of the ware, it was not subject to those cracks and flaws which disfigure our vessels; and as it was not liable to be corroded by acids, it could not be liable to any of the accidents which may ensue from the use of vessels glazed with lead.

GLEANING, the act of gathering or picking up the ears of corn left behind after the field has been reaped and the crop carried home. By the customs of some countries, particularly those of Melun and Estampes, all farmers and others are forbid, either by themselves or servants, to put any cattle into the fields, or prevent the gleaning in any manner whatever for

Glebe
Gliffon.

Glifter,
Globe.

the fpace of 24 hours after the carrying off the corn, under penalty of confiscation.

GLEBE, among miners, fignifies a piece of earth in which is contained fome mineral ore.

GLEBE, in law, the land belonging to a parifh-church befides the tithes.

GLECHOMA, **GROUND-IVY**; a genus of the angiofpermia order, belonging to the didymia clafs of plants. There are three fpecies; the moft remarkable of which is the hederacea, or common ground-ivy, which is fo well known that it requires no defcription. Many virtues were formerly attributed to this plant, which it is now found not to be poffeffed of. Some, however, it has. The leaves are thrown into the vat with ale to clarify it and give it a flavour. Ale thus prepared is often drank as an antifeorbutic. The expreffed juice mixed with a little wine, and applied morning and evening, deftroys the white fpecks upon horfes eyes. The plants that grow near it do not flourifh. It is faid to be hurtful to horfes if they eat much of it. Sheep eat it, horfes are not fond of it; cows, goats, and fwine, refufe it.

GLÉDITSIA, **TRIPLE-THORNED ACACIA**; a genus of the diœcia order, belonging to the polygamia clafs of plants. There is but one fpecies, which rifes with an upright trunk 30 or 40 feet high, branching out regularly with many long triple thorns, and clofely garnifhed with doubly pinnated leaves, each leaf confifting often of near 200 fmall leaves or foliola. The flowers are amentaceous, and of a greenifh colour proceeding from the fides of the branches, and fucceeded by broad feed-pods near a foot and an half long.— This plant is a native of South America, but will thrive in this country in any fituation. They are propagated by feeds, which are annually procured from America by the feedfmen.

GLEET, in medicine, the flux of a thin limpid humour from the urethra. See (the *Index* fubjoined to) **MEDICINE**.

GLICAS, or **GLYCAS**, (Michael), a Greek hiftorian about the middle of the 15th century, lived in Sicily, and wrote Annals of what paffed from the creation of the world to the death of Alexis Comnenus, in 1118. Leondavius added to it a fifth part, which carries it down to the taking of Conftantinople. Glिकास was alfo the author of feveral ufeful and curious letters.

GLENODES, the name of two cavities, or fmall depreflions, in the inferior part of the firft vertebra of the neck.

GLIRES, the name of Linnæus's fourth order of mammalia. See **ZOOLOGY**.

GLIS, in zoology. See **SCIURUS**.

GLISSON (Francis), a learned English phyfician in the 17th century, was educated at Cambridge, and was made regius professor of that univerfity. In 1634, he was admitted a fellow of the college of phyficians in London. During the civil wars, he praftifed phyfic at Colchefter, and afterwards fettled in London. He greatly improved phyfic by his anatomical diffections and obfervations, and made feveral new difcoveries of fingular ufe towards eftablifhing a rational praftice. He wrote, 1. *De rachitide*, &c. 2. *De lymphæductis nuper repertis*; with the *Anatonica prolegomena*, & *Anatomia hepatis*. 3. *De natura fubftantia emerge-*

tica; feu *de via vitæ nature*, ejufque tribus primis facultatibus, &c. quarto. 4. *Tractatus de ventriculo & inteftinis*, &c. The world is obliged to him for the *capula communis*, or *vagina portæ*.

GLISTER, in furgery. See **CLYSTER**.

GLOBE, in geometry, a round or fpherical body, more ufually called a *sphere*. See **SPHERE**.

GLOBE, is more particularly ufed for an artificial fphere of metal, plafter, paper, or other matter; on whole convex furface is drawn a map, or representation, either of the earth, or heavens, with the feveral circles conceived thereon. See **GEOGRAPHY**.

Globes are of two kinds, *terreftrial* and *celeftial*; each of very confiderable ufe, the one in aftronomy, and the other in geography; to perform many of the operations thereof, in an eafy, fenfible manner, fo as to be conceived without any knowledge of the mathematical grounds of thofe arts.

The fundamental parts, common to both globes, are an axis, representing that of the world; and a fpherical fhell, or cover, which makes the body of the globe, on whole external furface the representation is drawn. See **AXIS**, **POLE**, &c.

Globes, we have obferved, are made of divers materials, viz. filver, brafs, paper, plafter, &c. Thofe commonly ufed, are of plafter, and paper: The conftruction whereof is as follows:

Conftruction of GLOBES.—A wooden axis is provided, fomewhat lefs than the intended diameter of the globe; and into the extremes hereof two iron wires are driven, for poles: this axis is to be the beam, or bafis of the whole ftructure.

On the axis are applied two fpherical, or rather hemifpherical caps, formed on a kind of wooden mould or block.—Thefe caps confift of paltboard, or paper, laid one lay after another, on the mould, to the thicknefs of a crown-piece; after which, having flood to dry and embody, making an incifion along the middle, the two caps thus parted are flipped off the mould.

They remain now to be applied on the poles of the axis, as before they were on thofe of the mould: and to fix them in their new place, the two edges are fewed together with pack-thread, &c.

The rudiments of the globe thus laid, they proceed to ftrengthen and make it fmooth and regular. In order to this, the two poles are hafped in a metalline femicircle, of the fize intended; and a kind of plafter, made of whitening, water, and glue, heated, melted, and incorporated together, is daubed all over the paper-furface. In proportion as the plafter is applied, the ball is turned round in the femicircle, the edge whereof pares off whatever is fuperfluous and beyond the due dimension, leaving the reft adhering in places that are fhort of it. After fuch application of plafter, the ball ftands to dry; which done, it is put again in the femicircle, and frefh matter applied: thus they continue alternately to apply the compofition, and dry it, till fuch time as the ball every where accurately touches the femicircle; in which ftate it is perfectly fmooth, regular, firm, &c.

The ball thus finifhed, it remains to paffe the map or defcription thereon: in order to this, the map is projected in feveral gores, or gullefts; all which join accurately on the fpherical furface, and cover the whole

Globularia
||
Glocester.

whole ball. To direct the application of these gores, lines are drawn by a semicircle on the surface of the ball, dividing it into a number of equal parts corresponding to those of the gores, and subdividing those again answerably to the lines and divisions of the gores.

The papers thus palled on, there remains nothing but to colour and illuminate the globe; and to varnish it, the better to resist dust, moisture, &c.—The globe itself thus finished, they hang it in a brais meridian, with an hour-circle, and a quadrant of altitude; and thus fit it into a wooden horizon.

For the uses, &c. of the globes, see GEOGRAPHY, n° 33. 35, &c. ASTRONOMY, n° 168, 320. and Plate XLVIII. fig. 2.

GLOBULARIA, **GLOBULAR BLUE DAISY**; a genus of the monogynia order, belonging to the tetrandria class of plants. There are several species; but only one is commonly to be met with in our gardens, viz. the vulgaris, or common blue daisy. It hath broad thick radical leaves, three parted at the ends, upright stalks from about six to ten or twelve inches high, garnished with speared-shaped leaves, and the top crowned by a globular head of fine blue flowers composed of many florets in one cup. It flowers in June, and makes a good appearance; but thrives best in a moist shady situation. It is propagated by parting the roots in September.

GLOBULE, a diminutive of globe, frequently used by physicians in speaking of the red particles of the blood. See **Blood**.

GLOCESTER, the capital of Gloucestershire in England. It is an ancient city, and by Antoninus is called *Glevum*, or *Glevium*, which Camden thinks was formed from the British *Caer-Glowe*, signifying a fair city. It was built by the Romans to curb the Silures; and a colony was placed there, called *Colonia Glevum*. It stands upon the bank of the Severn; and, except on the side next the river, is surrounded by a wall. Towards the south there was anciently a castle built in the time of William the Conqueror, the remains of which is now the common gaol for debtors and felons. Ceaulin, king of the West Saxons, first took it from the Britons in 570; but it afterwards became subject to the Mercians. The present cathedral was erected by Aldred, archbishop of York, and bishop of Worcester, after the conquest, but hath been greatly improved and adorned since. In the fourth life Edward II. lies interred in an alabaster tomb; and not far from him, in the middle of the choir, Robert Curt-hose, eldest son of William the Conqueror. This city suffered much in the barons wars, was plundered by Edward the son of Henry III. and not long after almost entirely destroyed by an accidental fire. King John made it a borough; and Henry III. who was crowned here, a corporation. Richard III. made it a county of itself, adding two hundreds to it, and gave it his sword and cap of maintenance. It had once eleven parish-churches; but five of them were demolished when it was besieged by Charles I. against whom it had shut its gates. In the reign of Charles II. its walls were pulled down, and two hundreds taken from its county by act of parliament. It was erected into an episcopal see by Henry VIII. on the suppression of the abbey of St Peter, with a dean and six prebends. A-

Glocester
shire.

bout the time of the conquest, its chief business seems to have been forging of iron; for in Doomsday book it is said, that the only tribute required of it was so many ires, or bars of iron. At present it has ten incorporated companies, a stone-bridge over the river, with a key and wharf; but though it is well situated for trade, yet its traffic is not considerable, having been much impaired by the neighbourhood of Bristol. One of its chief manufactures now is pin-making. Several parliaments were anciently held here, particularly by Richard II. and III.; and in the town are many crosses and statues of the kings of England. By a charter from Charles II. it is governed by a steward, mayor, recorder, twelve aldermen, a town-clerk, two sheriffs chosen yearly out of twenty-six common-council men, a sword-bearer, and four sergeants at mace. Camden says, the Roman-way, that extends from St David's in Wales to Southampton, passes through this city. It gives title of duke to the second brother of his present majesty George III.

GLOCESTERSHIRE, a county of England, is bounded on the west by Monmouthshire and Herefordshire, on the north by Worcestershire, on the east by Oxfordshire and Warwickshire, and on the south by Wiltshire and part of Somersetshire. It is sixty miles in length, twenty-six in breadth, and one hundred and sixty in circumference; containing eight hundred thousand acres, twenty-nine hundreds, one city, twenty-five market-towns; and sends eight members to parliament, viz. two for the county, two for the city of Gloucester, two for Cirencester, and two for Tewksbury. It lies in the diocese that takes its name from the capital, and in the Oxford circuit. The air of the county is very wholesome, but the face of it is very different in different parts: for the eastern part is hilly, and is called *Cotteswold*; the western woody, and called the *Forest of Dean*; and the rest is a fruitful valley, through which runs the river Severn. This river is in some places between two and three miles broad; and its course through the country, including its windings, is not less than seventy miles. The tide of flood, called the *Boar*, rises very high, and is very impetuous. It is remarkable, that the greatest tides are one year at the full-moon, and the other at the new; one year the night-tides, and the next the day. This river affords a noble conveyance for goods and merchandise of all sorts, to and from the county; but it is watered by several others, as the Wye, the Avon, the Isis, the Leden, the Frome, the Stroud, and Windrush, besides lesser streams, all abounding with fish, the Severn in particular with salmon, conger-eels, and lampreys. The soil is in general very fertile, though pretty much diversified, yielding plenty of corn, pasture, fruit, and wood. In the hilly part of the county, or Cotteswold, the air is sharper than in the lowlands; and the soil, though not so fit for grain, produces excellent pasture for sheep; so that of the four hundred thousand that are computed to be kept in the county, the greater part are fed here. Of these sheep the wool is exceeding fine; and hence it is that this shire is so eminent for its manufacture of cloth, of which fifty thousand pieces are said to have been made yearly, before the practice of clandestinely exporting English wool became so common. In the

valc,

Glocester-
shire
||
Gloriosa.

vale, or lower part of the county, through which the Severn passes, the air and soil are very different from those of the Cotswold: for the former is much warmer, and the latter richer, yielding the most luxuriant pastures; in consequence of which, numerous herds of black cattle are kept, and great quantities of that excellent cheese, for which it is so much celebrated, made in it. The remaining part of the county, called the *Forest of Dean*, was formerly almost entirely over-run with wood, and extended twenty miles in length, and ten in breadth. It was then a nest of robbers, especially towards the Severn; but now it contains many towns and villages, consisting chiefly of miners, employed in the coal-pits, or in digging for or forging iron ore, with both which the forest abounds. These miners have their particular laws, customs, courts, and judges; and the king, as in all royal forests, has a swain-mote, for the preservation of the vert and venison. This forest was anciently, and is still noted for its oaks, which thrive here surprisingly; but as there is a prodigious consumption of wood in the forests, it is continually dwindling away. There were so many religious houses in the county before the reformation, that it gave occasion to the proverb, "As sure as God is in Gloucestershire."

GLOGAW, a strong and considerable town of Germany, in Silesia, and capital of a duchy of the same name. It is not very large, but is well fortified on the side of Poland. It has a handsome castle, with a tower, in which several counsellors were condemned by Duke John, in 1498, to perish with hunger. Besides the Papists, there are a large number of Protestants and Jews. It was taken by assault, by the king of Prussia, in 1741, and the garrison made prisoners. After the peace in 1742, the king of Prussia settled the supreme court of justice here, it being, next to Breslaw, the most populous place in Silesia. It is seated on the river Oder, in E. Lon. 15. 13. N. Lat. 51. 40.

GLOGAW the LESS, a town of Silesia, in the duchy of Opelen, now in possession of the king of Prussia. It is two miles S. E. of Great Glogaw, and forty-five N. W. of Breslaw. E. Lon. 16. 15. N. Lat. 51. 38.

GLORIA PATRI, among ecclesiastical writers. See DOXOLOGY.

GLORIOSA, **SUPERB LILY**; a genus of the monogynia order, belonging to the hexandria class of plants. There is but one species, a native of Malabar. It hath a thick, fleshy, tuberos root, sending forth from its centre declinated round stalks growing eight or ten feet long, and garnished with very long narrow leaves running out into a point, terminated by a long tendril. From the upper part of the stalks proceed large flame-coloured drooping flowers, consisting of six widely-spreading reflexed petals. It flowers in June and July, and is of admirable beauty whence; its name of *Gloriosa*, or *Superb Lily*.—This plant being a native of a very warm climate, requires the protection of a hot-house in this country. The flower-stalks shoot forth in March or April; which being long and trailing, must have tall racks placed for their support. The plants are propagated by offsets, which are produced in tolerable plenty, and may be separated any

time after the stalks decay, or in spring before new ones arise.

GLOSS, a comment on the text of any author, to explain his sense more fully and at large, whether in the same language or any other. See the article COMMENTARY. The word, according to some, comes from the Greek γλῶσση, "tongue;" the office of a *gloss* being to explain the text, as that of the tongue is to discover the mind.

Gloss is likewise used for a literal translation, or an interpretation of an author in another language word for word.

Gloss is also used in matters of commerce, &c. for the lustre of a silk, stuff, or the like.

GLOSSARY, a sort of dictionary, explaining the obscure and antiquated terms in some old author; such are Du Cange's Latin and Greek Glossaries, Spelman's Glossary, and Kennet's Glossary at the end of his Parochial Antiquities.

CLOSSOPETRA, in natural history, a genus of extraneous fossils, so called from their having been supposed the tongues of serpents turned into stone; though they are really the teeth of sharks, and daily found in the mouths of those fishes, where-ever taken.

The several sizes of teeth of the same species, and the several different species of sharks, furnish us with a vast variety of these fossil-teeth. Their usual colours are black, bluish, yellowish, or brown. In shape they are usually somewhat approaching to triangular; some are simple, and others have a smaller point on each side the large one. Many of them are quite straight; but they are frequently met with crooked and bent in all the different directions, some inwards, some outwards, and some sideways. They are also of various sizes; the larger ones being four or five inches long, and the smaller less than a quarter of an inch. They are found with us in the strata of blue clay, and are very plentiful in the clay-pits of Richmond, and some other places; but they are nowhere so common as in the island of Malta.

GLOTTIS, in anatomy, the narrow slit at the upper part of the apera arteria, which is covered by the epiglottis when we hold our breath and when we swallow. The glottis, by its dilatation and contraction, modulates the voice. See ANATOMY, n° 380.

GLOVE, a covering for the hand and wrist.

Gloves, with respect to commerce, are distinguished into leathern-gloves, silk-gloves, thread-gloves, cotton-gloves, worsted-gloves, &c. Leathern-gloves are made of chamois, kid, lamb, doe, elk, buff, &c.

To throw the glove, was a practice or ceremony very usual among our forefathers; being the challenge, whereby another was defied to single combat.—It is still retained at the coronation of our kings; when the king's champion casts his glove in Westminster-hall. See CHAMPION.

Fayn supposes the custom to have arose from the eastern nations, who in all their sales and deliveries of lands, goods, &c. used to give the purchaser their glove by way of livery or investiture. To this effect he quotes Ruth iv. 7. where the Chaldee paraphrase calls *glove*, what the common version renders by *sheep*. He adds, that the Rabbins interpret by *glove*, that passage in the civiith Psalm, *In Idumeam extendam calcamentum*

Glofa
||
Glove

calceamentum meum, "Over *Edm* will I cast out my shoe."—Accordingly, among us, he who took up the *glove*, declared thereby his acceptance of the challenge; and as a part of the ceremony, continues *Favyn*, took the *glove* off his own right-hand, and cast it upon the ground, to be taken up by the challenger. This had the force of a mutual engagement on each side, to meet at the time and place which should be appointed by the king, parliament, or judges.—The same author asserts, that the custom which still obtains of blessing *gloves* in the coronation of the kings of France, is a remain of the eastern practice of giving possession with the *gloves*, l. xvi. p. 1017, &c.

Anciently it was prohibited the judges to wear gloves on the bench. And at present in the stables of most princes, it is not safe going in without pulling off the gloves.

GLOW-WORM, a small insect, remarkable for its shining in the dark. See *CICINDELA*.

The male and female of this species differ greatly from each other. The male has wings, and is a small fly: the female has no wings, but is a large crawling worm.—The body of the male is oblong, and somewhat flattened; the wings are shorter than the body; the head is broad, dun, and flat; the eyes are large and black. This has no light issuing from it, and is not commonly supposed to be at all akin to the glow-worm. The female is what we expressly call by this name. This is a very slow-paced animal, somewhat resembling a caterpillar: the head is small, flat, hard, black, and sharp towards the mouth. It has short antennæ, and six moderately long legs. The body is flat, and is composed of twelve rings, whereas the body of the male consists only of five. It is of a dusky colour, with a streak of white down the back. It is often seen in the day-time, but is not known till dark; at which time it is easily distinguished by the glowing light, or lambent flame, that is seen near the tail, issuing from the under part of the body. It is commonly met with under hedges; and if carefully taken up may be kept alive many days upon fresh turfs of grass, all which time it will continue to shine in the dark.

The light of this little insect is so strong, that it will shew itself through several substances in which the creature may be put up; a thin pill-box easily shews it through, and even though lined with paper the light is not impeded by both. The creature is sluggish, and appears dead in the day-time; and its light is not distinguishable even if carried into a darkened room, unless the creature be turned upon its back and disturbed, so as to be put in motion, and then it is, but very faint: after sun-set the light returns, and with it the life and motion of the creature. The motion and light of this insect indeed seem in some measure to depend upon one another: it never shines but when its body is in some sort of motion; and when it shines most, the body is extended to one third more than its length in the day-time. In the time of brightest shining it will sometimes of a sudden turn its body about, and the light will not be longer than the head of a pin; and, on being touched, she will then immediately extend herself, and the light will become as large and as bright as ever.

Flying Glow-Worm, (*cicindela volans*.) In the war-

mer months of the year, this creature is sometimes caught in our houses flying to the flame of a candle; and examined in the dark is found to be luminous at these times, tho' perhaps less or not at all so at others; which may be a reason of its not being known though caught in the fields; and to this it may be owing, that many who have described this creature, have thought it not a native of Britain. Without wings, it is frequently enough found in form of the common glow-worm, and then always shines. *Aldrovandus* informs us, that it lays eggs which in a short time hatch small worms; and that these afterwards become flies, by the same sort of change which happens to butterflies and other species of winged insects. *Mouffet*, and *Thomas Bartholine*, give much the same description with *Aldrovandus*, but allow the male only to have wings. *Julius Scaliger*, however, contradicts this, and affirms that he has caught them both winged in the act of generation; but this is not acknowledged even by all those who have quoted the abovementioned passage from *Scaliger*. Mr *Waller*, in the philosophical transactions, confirms *Scaliger's* account, having observed them in the same manner in the act of copulation both winged; only with this difference, that the female was the larger of the two, which is the case with many other insects. The male and female in this winged state both shine in hot weather, and their light is so vivid that it may easily be seen even when there is a candle in the room. The vibrations of this light are irregular, and its colour greenish. The luminous parts are two small specks under the tail at the end, and the light continues in these some time after the tail is cut off; but then gradually goes out. The parts of insects continue alive in some degree for a considerable time after they are separated from the rest of the body; and probably the light of the tail of this animal continues just as long as this sort of life remains in it.

The use of this light seems to be to direct the animal in its course, and in the taking of its prey; and to this purpose it is admirably placed. The tail is easily bent under the belly, and then throws the light full upon any object about or under the head of the animal; and the eyes are placed, not on the upper part, but on the under side of the head; so that they have all the advantages of it, while the light in this part is not offensive to the eyes, as it naturally would have been if carried before the head. Upon occasion the insect can cover this light, so that its enemies cannot take the advantage in order to pursue it.

The insect is of the beetle kind, of a brown or dusky colour. It has hard case or shell wings, as the other beetles have; and, when these are expanded, there appears a pair of very large membranaceous ones. Its head is covered with a sort of shield or broad-brimmed hat; under this hat are placed the eyes, which are black and large, and are moveable, so that the creature can upon occasion thrust them forward to the sides of the hat or covering of the head. It has two hairy antennæ; and its legs are like those of the common fly, hard, shelly, and hairy. Its eyes afford an elegant object for the microscope, being composed of an infinite number of lenses, like those of the libellæ and other insects.

GLUKSTADT, a strong and considerable town of Germany,

Glue.

Germany, in the circle of Upper Saxony, and duchy of Holstein, with a strong cattle, and subject to Denmark. It is seated on the river Elbe, near its mouth; E. Long. 9. 15. N. Lat. 52. 53.

GLUE, among artificers, a tenacious viscid matter, which serves as a cement to bind or connect things together.

Glues are of different kinds, according to the various uses they are designed for, as the common glue, glove-glue, and parchment-glue; whereof the two last are more properly called *size*.

The common or strong glue is chiefly used by carpenters, joiners, cabinet-makers, &c.

It is made of the skins of animals, as oxen, cows, calves, sheep, &c.; and the older the creature is, the better is the glue made of its hide. Indeed whole skins are but rarely used for this purpose, but only the shavings, parings, or scraps of them; or the feet-sinews, &c. That made of whole skins, however, is undoubtedly the best; as that made of sinews is the very worst.

The Method of Making GLUE. In making glue of parings, they first steep them two or three days in water: then, washing them well out, they boil them to the consistence of a thick jelly; which they pass, while hot, through ozier-baskets, to separate the impurities from it; and then let it stand some time, to purify it further: when all the filth and ordures are settled to the bottom of the vessel, they melt and boil it a second time. They next pour it into flat frames or moulds; whence it is taken out pretty hard and solid, and cut into squares pieces or cakes. They afterwards dry it in the wind, in a sort of coarse net; and at last string it, to finish its drying.

The glue made of sinews, feet, &c. is managed after the same manner; only with this difference, that they bone and scour the feet, and do not lay them to steep.

Of this commodity there is a very great exportation from England; the English glue being universally allowed to be the best in Europe, partly from the excellency of the materials, and partly from the skill of the manufacturers. Next to this is the Flanders glue. In both countries it is made by the tanners from fragments of good skins dried with much care. In France it is a separate trade: and the glue-makers pick up their materials as they can, from the several dealers in skins, and boiling these with cow-heels make their glue; which as they purchase every thing, must render it dear, as well as of an inferior quality. The duty on exportation is ten-pence, and on importation three shillings and ten-pence, on every hundred weight.

The best glue is that which is made from the skin of the oldest beast, especially if a bull's hide is used. Experience likewise shews that glue is considerably improved in quality by keeping after it is made; and the surest way to try its goodness is to lay a piece to steep three or four days, and if it swell considerably without melting, and when taken out resumes its former driness, it is excellent.

A glue that will hold against fire or water, it is said, may be made thus: Mix a handful of quicklime with four ounces of linseed oil; boil them to a good thickness; then spread it on tin-plates in the shade, and it will become exceeding hard, but may be easily

dissolved over a fire, as glue, and will effect the business to admiration.

Neumann observes, that glue dissolved in a solution of lapis calaminaris in spirit of nitre, and afterwards inspissated, forms an extremely slippery tenacious mass, which might be of use for entangling flies, caterpillars, and other insects, if it was not too expensive.

Method of Preparing and Using GLUE. Set a quart of water on the fire, then put in about half a pound of good glue, and boil them gently together till the glue be entirely dissolved and of a due consistence. When glue is to be used, it must be made thoroughly hot; after which, with a brush dipped in it, besmear the faces of the joints as quick as possible: then clapping them together, slide or rub them lengthwise one upon another, two or three times, to settle them close; and so let them stand till they are dry and firm.—Mr Boyle gives a receipt for preparing a fine strong glue from isinglass in the following manner: Steep the isinglass for 24 hours in common brandy. When the menstruum has opened and mollified the isinglass, they must be gently boiled together, and kept stirring till they appear well mixed, and till a drop thereof, suffered to cool, turns into a strong jelly. Then strain it, whilst hot, through a clean linen-cloth, into a vessel to be kept close stopped. A gentle heat suffices to dissolve this glue into a transparent and almost colourless fluid, but very strong; so that pieces of wood glued together with it will separate elsewhere rather than in the place where they are joined. See ISINGLASS.

GLUME, *Gluma*, among botanists. See BOTANY, p. 1293.

GLUTEUS, in anatomy. See there, *Table of the muscles*.

GLYCINE, KNOBBED-ROOTED LIQUORICE-VETCH; a genus of the decandria order, belonging to the diadelphia class of plants. There is but one species commonly cultivated in our gardens, viz. the frutescens, or Carolina kidney-bean tree. This hath shrubby climbing stalks, twining round any support, 15 or 20 feet high, adorned with pinnated leaves of three pair of foliicles terminated by an odd one, and from the axillas clusters of large bluish-purple flowers, succeeded by long pods like those of the climbing kidney-bean. It flowers in June and July, but the seeds do not ripen in this country. It is easily propagated, either by seeds imported from America, where it is native, or by layers.—The stalks and roots of the abrus, another species of glycine which grows in Egypt and the Indies, are very sweet to the taste. Herman affirms that the juice obtained from them by decoction is little inferior to liquorice; whence its name of *wild-liquorice* in those parts of America where it is native.

GLYCYRRHIZA, LIQUORICE; a genus of the decandria order, belonging to the diadelphia class of plants. There are two species. 1. The glabra, or common liquorice, hath a long, thick, creeping root, striking several feet deep into the ground; upright, firm, herbaceous stalks annually, three or four feet high, garnished with winged leaves of four or five pair of oval lobes, terminated by an odd one; and from the axillas erect spikes of pale blue flowers in July, succeeded by short smooth pods.

The root of this is the useful part, which is replete with

Glue
||
Glycyrrhiza.

Glycyrrhiza.

with a sweet, balsamic, pectoral juice, much used in all compositions for coughs and disorders of the stomach. 2. The echinata, or prickly-podded liquorice, is nearly like the common sort, only the seed-pods are prickly.

Both these species are very hardy perennials; but the first is the sort commonly cultivated for use, its roots being fuller of juice and sweeter than the other.

The roots are perennial; but the stalks rise in spring, and decay in autumn.

They delight in a deep light soil, in which the roots will run down three or four feet deep, and attain a large size, if permitted to stand three or four years. From the main root smaller ones run off horizontally; and from these horizontal roots, that run near the surface, cuttings for sets or young plants are taken for propagation, which are generally procured at the time when the liquorice is taken up for use, being fit in three years after planting.

Where large quantities are required for sale, they may be cultivated in fields, as practised in many parts of England; vast quantities are also raised in the kitchen-gardens about London, where, by the richness and depth of the ground, the roots attain their utmost perfection in length and bulk.

The length and thickness of the roots is a principal consideration to the planter, as they are always sold by weight.

Propagation and culture. Their propagation is, as above observed, effected by cuttings of the small roots issuing from the sides of the main ones, near the surface of the earth, dividing them into lengths of six or eight inches, each having one or more good buds or eyes; and the proper season for procuring the sets for planting is, any time, in open weather, from October till March, though from the middle of February till the middle of March is rather the most successful season for planting.

An open situation is the most suitable for a plantation of these plants.

Particular regard should also be had to the soil: it ought to be of a light, loose temperature, and three or four feet deep if possible; for the roots of the liquorice will arrive at that depth and more, and the longer the roots the more valuable they are for sale by weight.

Having fixed on the ground, let it be trenched three spades deep, if the depth of proper soil will admit; then having your sets ready, proceed to plant them by line and dibble, planting the sets a foot distance in each row; putting them perpendicular into the ground, with the tops about an inch under the surface; and let the rows be a foot and a half asunder; though the London gardeners seldom allow more than twelve inches between row and row. These gardeners also sow a crop of onions on the same ground the first year; which, as the onions root but slender, and spread but little at top, may be done without any detriment to the liquorice, nor that to the onions, as it does not rise above ten or twelve inches high the first summer; observing to keep the ground clean from weeds during that season by hoeing. If there is a crop of onions, use the small hoe, cutting out the onions to four or five inches distance, clearing away such as grow

immediately close to the liquorice plants; and when the onions are gathered, give the ground a thorough hoeing with a large hoe, to loosen the surface and destroy all weeds effectually; and in autumn cut down the decayed stalks of the liquorice, and nothing more is necessary to be done till spring; when, in February or March, give a slight digging between the rows; during spring and summer, keep down all weeds by broad-hoeing; and in autumn, when the stalks are in a decaying state, cut them down to the surface of the earth.

In three years after planting, the roots of the liquorice will be fit to take up: and the proper season for this is, any time from the beginning of November till February; for it should neither be taken up before the stalks are fully decayed, nor deferred till late in spring, otherwise the roots will be apt to thrive and diminish in weight.

In taking them up, the small side-roots are trimmed off, and the best divided into lengths for fresh sets, and the main roots are tied in bundles ready for sale. It is of advantage to sell them as soon as possible after they are taken up, before they lose much of their weight. They are sold to the druggists, from about twenty to thirty or forty shillings per hundred weight, and an acre of ground has produced three thousand and upwards, which has been sold for more than sixty pounds; but the price is commonly in proportion to the goodness of the roots.

The common liquorice is cultivated in most countries of Europe for the sake of its root. That which is cultivated in Britain is preferable to such as comes from abroad; this last being generally mouldy, which this root is very apt to become, unless kept in a dry place. The powder of liquorice usually sold is often mingled with flour, and probably too often with substances not quite so wholesome: the best sort is of a brownish yellow colour (the fine pale yellow being generally sophisticated), and of a very rich sweet taste, much more agreeable than that of the fresh root. Liquorice is almost the only sweet that quenches thirst; whence it was called by the Greeks *adipson*. Galen takes notice, that it was employed in this intention in hydropic cases, to prevent the necessity of drinking. Mr Fuller, in his *Medicina Gymnastica*, recommends this root as a very useful pectoral; and says it excellently softens acrimonious humours, at the same time that it proves gently detergent: and this account is warranted by experience. An extract is directed to be made from it in the shops; but this preparation is chiefly brought from abroad, though the foreign extract is not equal to such as is made with proper care among ourselves.

GLYPH, in sculpture and architecture, denotes any canal or cavity used as an ornament.

GNAPHALUM, CUDWEED, GOLDS-LOCKS, ETERNAL FLOWER, &c. a genus of the polygamia superflua order, belonging to the syngenesia class of plants. There are 41 species; the most remarkable of which are, 1. The margaritaceum, or pearly white eternal flower, hath creeping, very spreading roots, crowned with broad, spear-shaped, white, hoary leaves; herbaceous, thick, woolly stalks, a foot and an half high, branching outward, garnished with long acute pointed white woolly leaves, and termina-

Glycyrrhiza
Gnaphalium.

ted by a corymbose cluster of yellowish flowers, which appear in June and July, and are very ornamental. 2. The *plantaginifolium*, hath large woolly radical leaves, decumbent running roots, and herbaceous simple stalks, rising six or eight inches high, terminated by a corymbus of white flowers in June, July, &c. 3. The *stæchas* hath a shrubby stalk, dividing into slender branches three feet long, terminated by corymbose clusters of yellow flowers, appearing in May and June. 4. The *orientale*, or oriental goldlocks, hath three varieties, with yellow, gold-coloured, and white silvery flowers. They have shrubby stalks, rising two or three feet high. 5. The *odoratissimum*, or sweet-scented eternal flower, hath shrubby winged stalks, branching irregularly a yard high, with corymbose clusters of bright yellow flowers, changing to a dark yellow. 6. The *arboresum*, or tree *gnaphalium*, hath a woody stem, branching four or five feet high, narrow sessile leaves, with revolute borders, smooth on their upper side, and roundish bunches of pale yellow flowers.

The first three sorts are hardy, and will thrive in any soil or situation. The two first increase exceedingly by their roots; and the third is easily propagated by slips. The fourth, fifth, and sixth sorts are somewhat tender; and therefore should be kept in pots, to be sheltered in a green-house or garden-frame in winter. Others may be planted in the full ground, in a dry and warm situation, especially the oriental kind and varieties, and likewise the sweet-scented kind; for these two species will struggle tolerably through an ordinary winter, and make a pretty appearance during the summer-months. All these are propagated by slips, or cuttings of their shoots.—The flowers of all these species are remarkable for retaining their beauty for years, if carefully gathered in a dry day, soon after they are blown.

GNAT, in zoology. See *Musca*.

There is no species of insects so particularly troublesome to mankind as the gnats. Others give more pain with their stings, but it is only by accident that we are struck by them; but the gnats thirst for our blood, and follow us about in whole companies for it. There are many marshy places in our country where the legs and arms are all the summer swelled to an enormous size by the bitings of these insects, and in many other countries they are yet more troublesome than with us.

All the naturalists have of late years employed the microscope to examine the parts of this little animal; and Swammerdam, Hooke, Bonanni, Lewenhock, &c. have given very good accounts and very valuable drawings of the creature.

The trunk of the gnat, or the instrument with which it strikes the flesh and sucks the blood from animal bodies, is of a very curious construction. The piercer, or, more properly, the piercers of this instrument are all entirely hid in the sheath of the instrument which makes what we call the *trunk*, and is the only part naturally offered to our view. This trunk appears to be cylindric in the greatest part of its length; and is covered with scales not unlike those on the nerves of the creature's wings, and resembling small leaves. Near its end it has a little swelling, where there is an oblong button broader at its insertion than

at its point: the end of this button is furnished with an aperture out of which the creature occasionally thrusts a fine point. Many naturalists have observed this point. Swammerdam considered it as a single pointed body formed to pierce the skin; but Lewenhock discovered that it was made up of a vast number of pointed bodies. There is no occasion, however, for all the accuracy of Swammerdam, nor all the power of the magnifying-glasses of Lewenhock, to discover that this is a complex body; a common small magnifying glass and a little attention will at any time discover it.

If a gnat is held by the corcelet between the fingers, and a little squeezed, the trunk will frequently be seen to open lengthwise on each side; sometimes only a little way, at others almost its whole length; and a fine glossy reddish filament shews itself at the opening of this case. This filament is bent and turned inwards, and one very soon distinguishes that it is indeed a congeries of a great number of filaments: these one may easily separate in some measure, from one another by any pointed instrument; and very often the filament of itself separates into several in the bending. It is plain, therefore, that the instrument destined to pierce the skin and suck the blood is of a complex structure; that what we might naturally take for this instrument, is only its case or sheath; and that this case or sheath, instead of a plain cylindric body is really a composition of two semi-cylindric ones, which the animal has the power of separating from one another on proper occasions.

The best way to get a regular sight of the trunk of this creature and of the manner of using it, is to suffer a gnat to settle upon the hand, and not to disturb him in the operation; but, with a magnifying glass in the other hand, to observe all his motions. In this case, we may first observe a small and slender point thrust out of the case, and the animal try several different parts of the skin with this sharp instrument. When this is done, it chooses that part which is most easily pierced, and where there lies a vessel underneath capable of furnishing as much blood as it will have occasion to suck. As soon as it has made its choice, the wound is immediately given: and since the point of the compound piercer cannot be protruded so far out of the case as it is necessary it should be to strike to a proper depth, the use of the slit in this case is seen; for while the button at the end of this remains firmly applied to the orifice of the wound, where the piercer is introduced, and supports that feeble and delicate instrument from bending, the case opens at the slit, and its two sides bend to give room to the piercer to penetrate; and, at length, when the piercer is sunk to its utmost depth, the two extremities of each piece touch, and the two sides are brought close together.

The several species of gnats have great variety in their trunks. One of them deserves to be remarked, as having no need of the button at the end of the case, common to all the rest, to support it while it enters the flesh. This has a case on which it rests itself as on a seventh leg; from which it darts a piercer, which without any support is of sufficient strength to penetrate the flesh, and do its office for the animal. This species of gnat has two very long beards placed above its trunk, and terminated by an end covered

covered with white scales. What remains of these beads is covered with brown scales, the body of the gnat also is brown, and the coracel reddish.

Though it is easy to find that the trunk of a gnat is composed of several pieces, yet it is by no means easy to say what the precise number of them is. The best microscopes often shew the whole a single body, its several parts being so extremely well joined; and when they have been found to be more than one, it is yet extremely difficult to say how many they are. Lwenhoeck believed them to be four in number; and Swammerdam, who at first believed the whole to be a single filament, afterwards thought he discovered six pieces going to its composition.

After separating the piercer of the gnat wholly from its sheath, if it be cut transversely near its base, or insertion in the head, and the section laid upon the plate of a microscope, and there touched with an extremely fine pointed instrument, it may be divided into four, and sometimes into five separate pieces. Two of these may be often seen to come out of a third as out of a canal or tube. The seeming necessity of a tube in this instrument for sucking the blood, has made many ready to persuade themselves that they have actually seen one: but if we follow the analogy of nature in her other works, we shall find there is no absolute necessity for such an organization in this part; since, in the gad-fly, the several pieces of which the piercer is composed are of themselves able to form a tube for the conveying of the blood.

Out of the immense number of gnats that one sees in summer, few can have any chance, even once in their lives, of sucking the blood of the larger animals; the rest, however, are by no means doomed to perpetual famine: the herbs of the field afford them a sufficient nourishment; for the gnats, like many other insects, are partly carnivorous, and partly otherwise, feeding equally on flesh and vegetables.

The wings of gnats are of a very curious structure, and worthy of an attentive observation. It is well known, that, on touching the wings of butterflies, a coloured powder is left upon the fingers; which, tho' to the naked eye it appears a mere shapeless dust, yet when examined by the microscope is found to consist of beautiful and very regularly figured bodies resembling feathers and scales. The generality of flies have nothing of this kind; but a close examination of the wings of the gnat will shew that they are not wholly destitute of them: they are bestowed much more sparingly indeed upon the gnat than on the butterfly; but they are arranged with great regularity.

The wings of the gnat, like those of most other insects, are of a cartilaginous substance, friable, and transparent like a flake of talc; and the circumference and many parts of the inner surface of the wing are strengthened by slender but firm ribs, which are divaricated into several ramifications. These appear to us to be mere fibril fibres; but they are probably hollow, and perform the office of vessels for the carrying of fluids or air necessary to the support of the wing, as well as to strengthen it. In the wings of butterflies there are similar ribs, but they are there all hid by the scales; but it is not so in the gnat; for in its wings, as in those of the other flies, these ribs seem naked. The assistance of the microscope, however, shews that they

are not absolutely so in the wings of gnats, but these nerves or ribs, with their several ramifications, look like as many stalks of a plant covered with small oblong leaves. The several scales that are attached to these ribs make acute angles with them, and are directed towards the end of the wing. The number of these scales is very small in comparison with those of the butterfly-clas; but they make a slighter and more elegant ornament. There are some species which have the intermediate spaces of the wing also adorned with these scales; but they are in these only thinly scattered. The intermediate spaces of the wings, when they have no scales are finely wrought and pointed: the inner edges of the wings are always bordered with a row of scales in form of a fringe; which, in some species, is composed of scales all of the same size, and in others is made up of many various lengths; and the exterior edge of the wing, which is surrounded by a rib much thicker and stronger than the interior, is not fringed with a series of scales, but is beset at proper distances with a kind of prickles.

The ordinary shape of the wings of the gnats is that of an oblong battledoor, one end of which is broader and the other more pointed. The narrower end is that from which goes the stalk by which it adheres to the rib. The other end is sometimes more, sometimes less round, and is sometimes a little hollowed in the middle. Some of these are much longer in proportion to their breadth than others; and some of them have their extremity formed into an open crescent. All have a number of fine lines running longitudinally through the whole scale.

GNAT-WORM, in natural history, a small aquatic insect produced from the egg of a gnat, and which is after its several changes again transformed into a gnat.

These worms do not frequent rivers, but ditches, ponds, and other stagnant waters; where they are found in vast abundance from the middle of May till towards the beginning of winter. This is the reason why watery and marshy places are found most to abound with gnats, and why the wet summers are found to produce the greatest numbers of them; because in dry seasons the ponds and ditches where they are to pass their worm-state are dried up, and the worms killed. These are creatures, however, that one need not go far to seek; since one need only expose a vessel of water in a garden, or any open place, in the summer time, and sooner or later it will not fail to produce plenty of them.

Before they arrive at their full growth, though they are then but small, they are easily found; because they are under a necessity of coming often to the top of the water by having occasion for frequent respiration; and to do this, they are obliged to keep the end of a small pipe they are furnished with from the last ring of their body above water. The end of this pipe is hollow and indented, and forms a sort of funnel upon the surface of the water. It is of the length of about three rings of the body, and is somewhat thicker at its insertion than at its extremity.

The worm is of the third class of those which are transformed into two-winged flies; that is, it has no legs, and has a head of a constant and invariable figure; and has no teeth or moveable jaws formed to play against one another. Their body is long, and their

head is somewhat detached from the first ring, to which it is fastened by a sort of neck. This first ring is the longest and largest of all, and seems a sort of corcelet to the worm. The creature has eight rings besides this. These grow smaller as they approach the hinder extremity.

While the worm is young, the body is whitish or greenish; but when it is at its full growth, and draws near the time of its change, it becomes greyish. The great transparency of the body of this worm gives a fine view of what passes within it; and it is at any time easy to see the motion of the intestines by which the food is pushed on towards the anus. The two principal tracheæ are also seen very distinctly in this creature. They are two white tubes placed in a direction parallel to one another, and run from the first ring to the tube of respiration.

This worm several times changes its skin in the course of its life. After three changes of this kind, which usually happen in the space of three weeks, it undergoes a fourth, in which the old skin is as easily thrown off as before; but the animal now appears in a new form, viz. that of a nymph. It is now shorter and rounder than before; and the body is so bent, that the tail is now applied to the under part of the head: this, however, is only its form in a voluntary state of rest, for it can yet move; and, when it pleases, extends its tail, and swims as swiftly as before.

All the parts of the future gnat may be seen in this nymph; the skin of it is extremely thin and transparent, yet sufficiently tough and firm for the use for which it is intended. It is uncertain how long the animal lives in this nymph state; but after the time is accomplished, its change into the gnat is very quick, and attended with great danger to the animal, since multitudes of them are drowned in the act of getting out.

GNESNA, a large and strong town of Great Poland, of which it is capital, and in the palatinate of Calish, with an archbishop's see, whose prelate is primate of Poland, and viceroy during the vacancy of the throne. It was the first town built in the kingdom, and formerly more considerable than at present. E. Lon. 18.20. N. Lat. 52.28.

GNOMES, *gnomi*, certain imaginary beings, who, according to the cabalists, inhabit the inner parts of the earth. They are supposed small in stature, and the guardians of quarries, mines, &c. See FAIRY.

GNOMON, in dialling, the style, pin, or cock of a dial; which, by its shadow, shews the hour of the day. The gnomon of every dial represents the axis of the world. See DIAL and DIALLING. The word is Greek, *γνομων*, which literally implies something that makes a thing known; by reason that the style or pin indicates or makes the hour known.

GNOMON, in geometry. If, in a parallelogram ABCD (Pl. CXL. fig. 8. n° 1.) the diameter AC be drawn; also two lines EF, HI, parallel to the sides of the parallelogram, and cutting the diameter in one and the same point G, so that the parallelogram is, by these parallels, divided into four parallelograms; then are the two parallelograms DG, BG, through which the diameter does not pass, called *complements*; those through which the diameters pass, EH, FI,

are called the *parallelograms about the diameter*; and a gnomon consists of the two complements, and either of the parallelograms about the diameter, viz. GD+HE+FI, or GD+FI+GB.

GNOMON, in astronomy, a style erected perpendicular to the horizon, in order to find the altitude of the sun. Thus, in the right-angled triangle ABC are given, AB the length of the style, BC the length of its shadow, and the right angle ABC. Hence, making CB the radius, we have this analogy for finding the angle ACB, the sun's altitude, viz. BC:AB::radius:tangent of the angle C.

By means of a gnomon, the sun's meridian altitude, and consequently the latitude of the place, may be found more exactly than with the smaller quadrants. See QUADRANT.

By the same instrument the height of any object GH may be found: for as DE, the distance of the observer's eye from the gnomon, is to DE, the height of the style; so is FH, the distance of the observer's eye from the object, to GH, its height.

GNOMON of a Globe; the index of the hour-circle. GNOMONICS, the art of dialling. See DIALLING.

GNOSTICS, (from the Greek *γινωσκω*, I know,) in church-history, Christian heretics so called; it being a name which almost all the ancient heretics affected to take, that they might express the new knowledge and extraordinary light to which they made pretensions.

St Epiphanius ascribes the origin of the Gnostics to Simon Magus; and says, that they acknowledged two principles, a good and a bad. They supposed there were eight different heavens, each of which was governed by its particular prince. The prince of the seventh heaven, whom they named *Sabaoth*, created the heavens and the earth, the six heavens below him, and a great number of angels. In the eighth heaven they placed their *Barbelo* or *Barbero*, whom they sometimes called the *father*, and sometimes the *mother of the universe*. All the Gnostics distinguished the creator of the universe from God who made himself known to men by his son, whom they acknowledged to be the Christ. They denied that the Word was made flesh; and asserted that Jesus Christ was not born of the Virgin Mary; that he had a body only in appearance, and that he did not suffer in reality. They neither believed a resurrection nor a judgment to come; but imagined that those who had been instructed in their maxims would return into the world, and pass into the bodies of hogs, and other like animals. They had several apocryphal books, as the *Gospel of St Philip*; the *Revelation of Adam*; the *Gospel of Perfection*, &c.

GOA, a large and strong town of Asia, in the peninsula on this side the Ganges, and on the Malabar coast. It was taken by the Portuguese in 1508, and is the chief town of all the settlements the Europeans have in India. It stands in an island about 12 miles in length, and six in breadth; and the city is built on the north side of it, having the convenience of a fine salt-water river, capable of receiving ships of the greatest burthen, where they lie within a mile of the town. The banks of the river are beautified with a great number of handsome structures; such as churches, castles,

caffles, and gentlemen's houfes. The air within the town is unwholefome, for which reason it is not fo well inhabited now as it was formerly. The viceroy's palace is a noble building; and ftands at a fmall diftance from the river, over one of the gates of the city, which leads to a fpacious ftreet, terminated by a beautiful church. This city contains a great number of handfome churches, convents, and cloifters, with a ftately large hofpital; all well endowed, and kept in good repair. The market-place takes up an acre of ground; and in the fhops about it may be had the produce of Europe, China, Bengal, and other countries of lefs note. Every church has a fet of bells, fome of which are continually ringing. Their religion is the Roman Catholic, and they have a fevere inquisition. There are a great many Indian converts; but they generally retain fome of their old cuftoms, particularly they cannot be brought to eat beef. However, there are many Gentoo's in the city, who are tolerated, becaufe they are more induftrious than the Chriftians, and better artifts. The clergy are very numerous, and illiterate; but the churches are finely embellifhed, and have great numbers of images. The houfes are large, and make a fine fhew; but within they are but poorly furnifhed. The inhabitants are contented with greens, fruits, and roots; which, with a little bread, rice, and filh, is their principal diet, though they have hogs and fowls in plenty. However, they are very much addifted to women; and are generally weak, lean, and feeble. Captain Hamilton flood on a hill near the city, and counted above 80 churches, convents, and monafteries; and he was told, that there were about 30,000 priefts and monks. The body of St Francis Xavier is buried in St Paul's church; and, as they pretend, performs a great many miracles. It is remarkable, that none of the churches, except one, have glafs windows; for they make ufe of clear oyster-shells inftead of glafs, and all their fine houfes have the fame. Goa itfelf has few manufactures or productions; their beft trade being in arrack. The river's mouth is defended by feveral forts and batteries, well planted with large cannon on both fides; and there are feveral other forts in different places. It is 250 miles N. by W. of Cochinchina. E. Lon. 74. o. N. Lat. 15. 31.

GOAL. See GAO.

GOAT, in zoology. See CAPRA.

GOAT's-Beard, in botany. See TRAGOPOGON.

GOAT-Sucker, in ornithology. See CAPRIMULGUS.

GOBELIN (Giles), a famous French dyer, in the reign of Francis I. difcovered a method of dying a beautiful fcarlet, and his name has been given ever fince to the fineft French fcarlets. His houfe, in the fuburb of St Marcel at Paris, and the river he made ufe of, are ftill called the *Gobelins*. An academy for drawing, and a manufactory of fine tapeftries, were erected in this quarter in 1666; for which reason the tapeftries are called the *Gobelins*.

GOBIUS, in ichthyology, a genus of fifhes belonging to the order of thoracii. They have two holes between the eyes, four rays in the membrane of the gills, and the belly-fins are united in an oval form. There are eight fpecies, principally diftinguifhed by the number of rays in their fins.

GOD, one of the many names of the Supreme

Being. See CHRISTIANITY; METAPHYSICS, n° 6. 222 - 230.; and MORAL PHILOSOPHY, n° 161, &c.

GODDARD (Jonathan), an eminent phyfician and chemift, and one of the firft promoters of the Royal Society, was born about the year 1617. He was elected a fellow of the college of phyficians in 1646, and appointed reader of the anatomical lecture in that college in 1647. As he took part againft Charles I. accepted the wardfhip of Meiton-college, Oxford, from Oliver Cromwell when chancellor, and fat fole representative of that univerfity in Cromwell's parliament, he was removed from his wardfhip in a manner difgraceful to him by Charles II. He was however then profeffor of phyfic at Grefham college, to which he retired, and continued to attend thofe meetings that gave birth to the Royal Society; upon the firft eftablifhment of which, he was nominated one of the council. Being fully perfuaded that the preparation of medicines was no lefs the phyfician's duty than the prefcribing them, he contently prepared his own; and in 1668 publifhed a treatife recommending his example to general practice. He died of an apopleftic fit in 1674; and his memory was preferred by the drops that bore his name, otherwife called *Gutta Anglicana*, the feeret of which he fold to Charles II. for 5000 l. and which Dr Lifter affures us was only the volatile fpirit of raw filk rectified with oil of cinnamon or fome other effential oil. But he claims more particular regard, if what bifhop Seth Ward fays be true, that he was the firft Englifhman who made that noble aftronomical inftrument, the telefcop.

GODDESS, a heathen deity of the female fex.

The ancients had almoft as many goddeffes as gods: fuch were, Juno the goddefs of air, Diana the goddefs of woods, &c. and under this character were reprefented the virtues, graces, and principal advantages of life; truth, juftice, piety, liberty, fortune, victory, &c.

It was the peculiar privilege of the goddeffes to be reprefented naked on medals; for it was fuppofed that the imagination muft be awed and reftained by the confideration of the divine character.

GODEAU (Anthony), bifhop of Grasse and Vence in France, was born at Dreux in 1605. He was a very voluminous writer, both in profe and verfe; but his principal works are, 1. *An ecclefiaftical hiftory*, 3 vols. folio, containing the firft eight centuries only, as he never finifhed more. 2. *Translation of the Pfalms into French verfe*; which was fo well approved, that even thofe of the reformed religion preferred it to that of Marat. He died in 1671.

GODFATHERS and GODMOTHERS, perfons who, at the baptifm of infants, anfwer for their future conduct, and folemnly promife that they will renounce the devil and all his works, and follow a life of piety and virtue; and by this means lay themfelves under an indifpenfable obligation to inftruct them, and watch over their conduct.

This cuftom is of great antiquity in the Chriftian church; and was probably inftituted to prevent children being brought up in idolatry, in cafe their parents died before they arrived at years of difcretion.

The number of godfathers and godmothers is reduced to two, in the church of Rome; and three, in the church of England; but formerly they had as many as they pleafed.

GODFREY

GODFREY (of Bouillon), prince of Lorrain, a most celebrated crusader, and victorious general. He was chosen general of the expedition which the Christians undertook for the recovery of the Holy Land and sold his dukedom to prepare for the war. He took Jerusalem from the Turks in 1099; but his piety, as historians relate, would not permit him to wear a diadem of gold in the city where his Saviour had been crowned with thorns. The sultan of Egypt afterwards sent a terrible army against him; which he defeated, with the slaughter of above 100,000 of the enemy. He died in 1160.

GODOLPHIN (John), an eminent English civilian, was born in the island of Scilly in 1617, and educated at Oxford. In 1642-3, he was created doctor of civil law; in 1653, he was appointed one of the judges of the admiralty; and at the Restoration, he was made one of his majesty's advocates. He was esteemed as great a master of divinity, as of his own faculty; and published, 1. *The holy limbeck*. 2. *The holy labour*. 3. *A view of the admirals jurisdiction*. 4. *The orphan's legacy*. 5. *Repertorium canonicum, &c.* He died in 1678.

GODWIN (Francis), successively bishop of Landaff and Hereford, was born in 1567. He was eminent for his learning and abilities; being a good mathematician, an excellent philosopher, a pure Latinist, and an accurate historian. He understood the true theory of the moon's motion, a century before it was generally known. He first started those hints afterwards pursued by bishop Wilkins, in his *Secret and swift messenger*; and published *A catalogue of the lives of English bishops*. He has nevertheless been accused as a great simoniac, for omitting no opportunity of disposing of preferments in order to provide for his children. He died in 1648.

GODWIN (Thomas), a learned English writer born in 1517, was master of the free-school at Abingdon in Berkshire; where he educated a great many youths, who became eminent both in church and state. His works shew him to have been a man of great learning; such as, *Historia Romane antologia*, *Synopsis antiquitatum Hebraicarum*, *Moses & Aaron*, *Floriolum Phrasicon*, &c. He died in 1642.

GODWIT, in ornithology. See **SCOLOPAX**.

GOES, or **TER GOES**, a strong and considerable town of the United Provinces, in Zealand, and capital of the island of South-Beveland. It communicates with the sea by a canal; and is 10 miles east of Middelburg, and 30 north of Ghent. E. Lon. 3. 50. N. Lat. 51. 33.

GOGMAGOG-HILLS, are hills so called, three miles from Cambridge, remarkable for the intrenchments and other works cast up here: whence some suppose it was a Roman camp; and others, that it was the work of the Danes.

GOITO, a town of Italy, in the duchy of Mantua, taken by the Germans in 1701, and by the prince of Hesse in 1706. It is seated on the river Mincio, between the lake of Mantua and that of Garda, 10 miles north-west of Mantua. E. Lon. 11. o. N. Lat. 45. 16.

GOLCONDA, a kingdom of Asia, in the peninsula on this side the Ganges. It is bounded on the north by that of Orissa, on the west by that of Ba-

lagate, on the south by Bijnagar, and on the east by the gulph of Bengal. It abounds in corn, rice, and cattle; but that which renders it most remarkable are the diamond-mines, they being the most considerable in the world: they are usually purchased of the black merchants, who buy parcels of ground to search for these precious stones in. They sometimes fail in meeting with any, and in others they find immense riches. They have also mines of salt, fine iron for sword-blades, and curious calicoes and chintzes. It is subject to the Great Mogul; and has a town of the same name, seated at the foot of a mountain, being one of the largest in the East-Indies. It is about six miles in circumference; and was formerly the residence of the kings, till it was conquered by the Great Mogul. It is now much frequented by the European merchants. E. Lon. 79. 10. N. Lat. 16. 30.

GOLD, the most precious of all the metals.

For an account of the places where gold is found in greatest quantities; the methods of extracting it from the ore, and afterwards purifying it; with an account of its different phenomena in combination with other metals; see the article **METALLURGY**. An account of its chemical properties, solution in different menstrua, &c. is given under **CHEMISTRY**, n° 194, 236, 348.—For its effects on glass, see the article **GLASS** and **VITRIFICATION**.

GOLD is the most fixed of all the metals; and it hath been generally believed, till very lately, that it was absolutely fixed in every degree of fire which could be excited by human art. Some chemists indeed pretended to have evaporated, calcined, and even vitrified gold, by exposing it to the focus of a good burning-glass; but as their experiments did not appear to have all the authenticity that was necessary, the opinion fell into discredit; and this the more readily that gold is found to resist the most violent furnace fires without any loss. Mr Macquer, however, in the last additions to his *Chemical Dictionary*, hath found, that this metal, when exposed to the heat of a good burning-glass, loses in weight considerably, and that even in a very short time. He held some very fine gold in the focus of a large burning-glass, at several times, at half an hour each time, sometimes in a hollow piece of charcoal, or in vessels made of earthen ware and porcelain; and whenever the air was very clear, and the sun bright, a very sensible smoke arose to the height of three or four inches. To know the nature of this smoke, a cold silver-plate was exposed to it; by which means, some of the vapour appeared on the silver like a tarnish a little less white, but not sensibly yellow. But when this part of the silver was rubbed with a burnisher, it appeared so evidently to be gilded, that none could doubt the evaporation of the metal. At this experiment several members of the Academy of Sciences were present.

The experiments with regard to the calcination and vitrification of gold were also tried by Mr Macquer, in presence of Messrs Montigny, Cadet, Lavoisier, and Brillon. The glass employed was that of Tschirnhausen, the same which had formerly been employed by Mr Homberg. Gold of 24 carats fine was exposed to the focus of this glass several times, by half an hour at a time, on vessels made of a very refractory porcelain earth.—When the gold was melted,

which

which happened in the space of a few seconds, it took a spherical form as nearly as its gravity would permit, and had nearly the consistence of quicksilver. The melted mass soon acquired a rotatory motion round its axis, sometimes in one direction, and sometimes in another, according to the direction of the focus upon the metal; (which, by-the-by, is a very curious appearance, and seems difficult to be accounted for). A smoke arose as in the former experiments. On the surface of the melted gold, spots evidently vitrified were formed, which separated from the metal. These afterwards united into a dark violet-coloured mass, of a greater curvature than the melted gold, in which they were found to be set, as jewels in a ring; and produced nearly the same appearance that the transparent cornea has on the globe of the eye; that is, as the segment of a small sphere joined to the surface of a large one. On a mass of liquid gold, of about half an inch diameter, he obtained, after four hours calcination, a button of this violet glass, whose diameter exceeded two lines; and this glass was observed gradually to increase as the gold diminished. Yet, though this very much resembles the vitrification of the gold, Mr Macquer doth not take upon him to assert that it certainly is so; seeing it may arise from the vessels on which the gold is supported, and which were coloured purple to a considerable distance, and besides were sprinkled with many small particles of gold undecomposed, easily distinguishable by a microscope; and in the violet glass also, many similar particles were observable. To determine the matter accurately, the experiment ought to be continued till all the particles of the metal be certainly either vitrified or evaporated.—Though this experiment, however, is hitherto equivocal when the heat of burning-glasses is made use of, it certainly succeeds with a strong flash of electric fire. See ELECTRICITY, n° 113.

Method of Recovering Gold from Gilt Works. The solubility of gold and the indissolubility of silver in aqua regia affords a principle on which gold may be separated from the surface of silver; and, on this foundation, different processes have been contrived, of which the two following appear to be the best.—Some powdered sal ammoniac, moistened with aqua fortis into the consistence of a paste, is spread upon the gilt silver, and the piece heated, till the matter smokes, and becomes nearly dry: being then thrown into water, it is rubbed with a scratch brush, composed of fine brass-wire bound together, by which the gold easily comes off. The other way is, by putting the gilt silver into common aqua regia, kept so hot as nearly to boil, and turning the metal frequently till it becomes all over black: it is then to be washed with a little water, and rubbed with the scratch brush, to get off what gold the aqua regia may have left. This last method appears preferable to the other; as the same aqua regia may be made to serve repeatedly till it becomes saturated with the gold, after which the gold may be recovered pure by precipitation with solution of vitriol, as directed under the article METALLURGY.

For separating gold from gilt copper, some direct a solution of borax to be applied on the gilt parts, but nowhere else, with a pencil, and a little powdered sulphur to be sprinkled on the places thus moistened; the principal use of the solution of borax seems

to be to make the sulphur adhere; the piece being then made red hot, and quenched in water, the gold is said to be so far loosened, as to be wiped off with a brush. Others mix the sulphur with nitre and tartar, and form the mixture with vinegar into a paste, which is spread upon the gilt parts.

Schlutter recommends mechanical means, as being generally the least expensive, for separating gold from the surface both of silver and copper. If the gilt vessel is round, the gold is conveniently got off by turning it in a lathe, and applying a proper tool, a skin being placed underneath for receiving the shavings: he says it is easy to collect into two ounces of shavings, all the gold of a gilt vessel weighing thrice as many pounds. Where the figure of the piece does not admit of this method, it is to be properly fixed, and scrapers applied, of different kinds, according to its size and figure; some large, and furnished with two handles, one at each end; others small and narrow, for penetrating into depressed parts. If the gold cannot be got off by either of these ways, the file must be had recourse to, which takes off more of the metal underneath than the turning tool or the scraper, particularly than the former. The gold scrapings, or filings, may be purified from the silver or copper they contain, by the methods described under the article METALLURGY.

The editors of the *Encyclopédie* give a method of recovering the gold from wood that has been gilt on a water-fire: this account is extracted from a memoir on the same subject, presented to the Academy of Sciences by M. de Montamy. The gilt wood is steeped for a quarter of an hour, in a quantity of water, sufficient to cover it, made very hot: the fire being thus softened, the wood is taken out, and scrubbed, piece by piece, in a little warm water, with short stiff bristle brushes of different sizes, some small for penetrating into the carvings, and others large for the greater dispatch in flat pieces. The whole mixture of water, fire, gold, &c. is to be boiled to dryness, the dry matter made red hot in a crucible to burn off the fire, and the remainder ground with mercury, either in a mortar, or, where the quantity is large, in a mill.

GOLD-Coast. See GUINEA.

GOLD-Wire, a cylindrical ingot of silver, superficially gilt or covered with gold at the fire, and afterwards drawn successively through a great number of little round holes, of a wire-drawing iron, each less than the other, till it be sometimes no bigger than a hair of the head. See WIRE-DRAWING.

It may be observed, that, before the wire be reduced to this excessive fineness, it is drawn through above an hundred and forty different holes; and that each time they draw it, it is rubbed afresh over with new wax, both to facilitate its passage, and to prevent the silver's appearing through it.

GOLD-Wire flattened, is the former wire flattened between two rollers of polished steel, to fit it to be spun on a slock, or to be used flat, as it is, without spinning, in certain stuffs, laces, embroideries, &c. See STUFF, &c.

GOLD-Thread, or *Spun-gold*, is flattened gold, wrapped or laid over a thread of silk, by twisting it with wheel and iron-bobbins.

To dispose the wire to be spun on silk, they pass it between two rollers of a little mill: these rollers are of nicely polished steel, and about three inches in diameter. They are set very close to each other, and turned by means of a handle fastened to one of them, which gives motion to the other. The gold wire in passing between the two, is rendered quite flat, but without losing any thing of its gilding; and is rendered so exceedingly thin and flexible, that it is easily spun on silk-thread, by means of a hand-wheel, and so wound on a spool or bobbin. See *WIRE-DRAWING*.

GOLD-Leaf, or *Beaten Gold*, is gold beaten with a hammer into exceeding thin leaves, so that it is computed, that an ounce may be beaten into sixteen hundred leaves, each three inches square, in which state it takes up more than 159,052 times its former surface. See *GOLD-LEAF*.

It must be observed, however, that gold is beaten more or less, according to the kind or quality of the work it is intended for; that for the gold-wire drawers to gild their ingots withal, is left much thicker than that for gilding the frames of pictures, &c. See *GILDING*.

GOLD-Brocade. See *BROCADE*.

Fulminating-GOLD. See *CHEMISTRY*, n° 356.—Since that article was printed, however, we are informed by Mr Macquer, that fulminating gold may be made without any nitrous acid. Of consequence, the conjecture there given concerning the cause of its explosion cannot be true in as far as the nitrous ammoniacal salt is concerned; though possibly the fixed air contained in the calx of gold may considerably contribute towards it.—Mr Bergman, whom Mr Macquer quotes, found that he could prepare fulminating gold at any time, by applying volatile alkali to it when in a greatly divided state. He doth not indeed tell us whether the alkali used, was in a caustic or mild state, (*i. e.* whether it was deprived of its fixed air or not): but though the experiment should even be found to succeed with caustic alkali, still the explosion might depend on fixed air; because caustic volatile alkalies are found either to imbibe, or generate this kind of air, even though excluded from the atmosphere in the most careful manner; and hence the complaint among druggists, that alkaline spirits, made with quicklime, do not keep equally well with others. See *ALKALINE SPIRITS*.

Shell-GOLD, that used by the illuminers, and where-with we write gold-letters. It is made of the parings of leaf-gold, and even of the leaves themselves, reduced into an impalpable powder, by grinding on a marble with honey. After leaving it to infuse some time in aqua fortis, they put it in shells, where it sticks. To use it, they dilute it with gum-water, or soap water.

GOLD-Finch, in ornithology. See *FRINGILLA*.

These are feed-birds of very curious colours, and which, were they not so common in this country, would probably be very much esteemed.

They are usually taken about Michaelmas, and soon become tame; but they differ very much in their song.—They frequently breed in the upper part of plum-trees, making their nests of the moss that grows upon apple-trees, and of wool; quilting the inside with all sorts of hairs they find upon the ground. They breed

three times a-year; and the young are to be taken with the nest at about ten days old, and fed as follows:—Pound some hemp-feed very fine in a mortar; then sift it through a sieve, and add to it as much wheat-bread as hemp-feed; and likewise a little flower of canary-seeds: then with a small stick or quill, take up as much as the bigness of a white-pea, and give them several times a-day. This ought to be made fresh every day: for if it is suffered to sour, it will spoil their stomachs, causing them to cast up their meat; which if they do, it is very probable that they will die.—These young birds must be carefully kept warm till they can feed themselves, for they are very tender. In feeding, be sure to make your bird clean his bill and mouth. If any of the meat falls upon his feathers, take it off, or else he will not thrive. Such as eat hemp-feed, to purge them, should have the seeds of melons, succory, and mercury; or else let them have lettuce and plantane for that purpose. When there is no need of purging, give them two or three times a week a little sugar or loam in their meat, or at the bottom of the cage; for all seeds have an oiliness, so that if they have not something to absorb it, in length of time it fouls their stomachs, and brings on them a flux, which is very dangerous.

GOLD-Fish. See *CYPRINUS*.

GOLDEN, something that has a relation to gold, or consists of gold.

GOLDEN Calf, was a figure of a calf, which the Israelites cast in that metal, and set up in the wilderness, to worship, during Moses's absence into the mount; and which that legislator, at his return, burnt, grinded to powder, and mixed with the water the people were to drink of; as related in Exod. xxxii. The commentators have been divided on this article: the pulverizing of gold, and rendering it potable, is a very difficult operation in chemistry. Many, therefore, suppose it done by a miracle: and the rest, who allow of nothing supernatural in it, advance nothing but conjectures as to the manner of the process. Moses could not have done it by simple calcination, nor amalgamation, nor antimony, nor calcination; nor is there one of those operations that quadrates with the text.

M. Stahl has endeavoured to remove this difficulty. The method Moses made use of, according to this author, was by dissolving the metal with hepatic sulphur; only, instead of the vegetable alkali, he made use of the Egyptian natron, which is common enough throughout the east. See *CHEMISTRY*, n° 359.

GOLDEN Fleece, in the ancient mythology, was the skin, or fleece of the ram, upon which Phryxus and Hella are supposed to have swam over the sea to Colchis; and which being sacrificed to Jupiter, was hung upon a tree in the grove of Mars, guarded by two brazen-hoof'd bulls, and a monstrous dragon that never slept; but was taken and carried off by Jason and the Argonauts.

Many authors have endeavoured to shew that this fable is an allegorical representation of some real history, particularly of the philosopher's stone. Others have explained it, by the profit of the wool-trade to Colchis, or the gold which they commonly gathered there with fleeces in the rivers.

Order of the GOLDEN FLEECE, is a military order instituted

Golden,
Goldingen.

instituted by Philip the Good, duke of Burgundy, in 1429. It took its denomination from a representation of the *golden fleece*, borne by the knights on their collars, which consisted of flints, and steels. The king of Spain is now grand master of the order, in quality of duke of Burgundy: the number of knights is fixed to thirty-one.

It is usually said to have been instituted on occasion of an immense profit which that prince made by wool; though others will have a chemical mystery couched under it, as under that famous one of the ancients, which the adepts contend to be no other than the secret of the elixir, wrote on the fleece of a sheep.

Oliver de la Marche writes that he had suggested to Philip I. archduke of Austria, that the order was instituted by his grandfather Philip the Good, duke of Burgundy, with a view to that of Jason; and that John Germain, bishop of Chalons, chancellor of the order, upon this occasion made him change his opinion, and assured the young prince that the order had been instituted with a view to the fleece of Gideon. William bishop of Tournay, chancellor likewise of the order, pretends that the duke of Burgundy had in view both the golden fleece of Jason, and Jacob's fleece, *i. e.* the speckled sheep belonging to this patriarch, according to agreement made with his father-in-law Laban. Which sentiment gave birth to a great work of this prelate, in two parts: in the first, under the symbol of the fleece of Jason, is represented the virtue of magnanimity, which a knight ought to possess; and under the symbol of the fleece of Jacob, he represents the virtue of justice.

Paradin is of the same mind, and tells us that the duke designed to insinuate that the fabulous conquest which Jason is said to have made of the *golden fleece* in Colchis, was nothing else but the conquest of virtue, which gains a victory over those horrible monsters vice and our evil inclinations.

GOLDEN NUMBER, in chronology, a number shewing what year of the moon's cycle any given year is. See **ASTRONOMY**, n° 304—307.

GOLDEN-ROSE. The pope annually consecrates a golden-rose on the fourth Sunday in Lent, which is sent to princesses, or to some church, as a mark of his peculiar affection.

GOLDEN RULE, in arithmetic, a rule or praxis, of great use and extent in the art of numbers; whereby we find a fourth proportional to three quantities given.

The *golden rule* is also called the *Rule of Three*, and *Rule of Proportion*. See its nature and use under the article **ARITHMETIC**, n° 13.

GOLDINGEN, a town of Poland in the duchy of Courland, with a handsome castle, seated on the river Weia, in E. Long. 22. 31. N. Lat. 56. 48.

GOLDSMITH, or, as some choose to express it, *silversmith*, an artist who makes vessels, utensils, and ornaments, in gold and silver.

The goldsmith's work is either performed in the mould, or beat out with the hammer or other engine. All works that have raised figures, are cast in a mould, and afterwards polished and finished: plates, or dishes, of silver or gold, are beat out from thin flat plates; and tankards, and other vessels of that kind, are formed of plates soldered together, and

their mouldings are beat, not cast. The business of Goldsmith's the goldsmiths formerly required much more labour than it does at present; for they were obliged to hammer the metal from the ingot to the thinness they wanted; but there are now invented flattening-mills, which reduce metals to the thinness that is required, at a very small expence. The goldsmith is to make his own moulds; and for that reason ought to be a good designer, and have a taste in sculpture: he also ought to know enough of metallurgy, to be able to assay mixed metals, and to mix the alloy.

The goldsmiths in London employ several hands under them for the various articles of their trade: such are the jeweller, the snuff-box and toy maker, the silver-turner, the gilder, the burnisher, the chaffer, the refiner, and the gold-beater. See the articles **JEWELLER**, &c.

GOLDSMITHS are superior tradesmen: their wares must be assayed by the wardens of the company of this name in London, and marked; and gold is to be of a certain touch. No goldsmith may take above one shilling the ounce of gold, besides what he has for the fashioning, more than the buyer may be allowed for it at the king's exchange; and here any false metal shall be seized and forfeited to the king. The cities of York, Exeter, Bristol, &c. are places appointed for the assaying wrought-plate of goldsmiths; also a duty is granted on silver-plate of six-pence an ounce, &c. Plate made by goldsmiths shall be of a particular fineness, on pain of forfeiting 10 l.; and if any parcel of plate sent to the assayers is discovered to be of a coarser alloy than the respective standards, it may be broken and defaced; and the fees for assaying are particularly limited.

GOLDSMITH (Oliver), a celebrated English writer, was born at Roscommon in Ireland, in the year 1731. His father, who possessed a small estate in that county, had nine sons, of which Oliver was the third. He was originally intended for the church; and with that view, after being well instructed in the classics, was, with his brother the Rev. Henry Goldsmith, placed in Trinity college, Dublin, about the latter end of the year 1749. In this seminary of learning he continued a few years, when he took a bachelor's degree; but, his brother not being able to obtain any preferment after he left the college, Oliver, by the advice of Dean Goldsmith of Cork, turned his thoughts to the study of physic; and, after attending some courses of anatomy in Dublin, proceeded to Edinburgh in the year 1751, where he studied the several branches of medicine under the different professors in that university. His beneficent disposition soon involved him in unexpected difficulties; and he was obliged precipitately to leave Scotland, in consequence of engaging himself to pay a considerable sum of money for a fellow-student.

A few days after, about the beginning of the year 1754, he arrived at Sunderland, near Newcastle, where he was arrested at the suit of a taylor in Edinburgh, to whom he had given security for his friend. By the good offices of Laughlin MacLaine, Esq; and Dr. Sleight, who were then in the college, he was soon delivered out of the hands of the bailiff; and took his passage on board a Dutch ship to Rotterdam, where, after a short stay, he proceeded to Brussels:

Goldsmith. he then visited great part of Flanders; and after passing some time at Strasbourg and Louvain, where he obtained a degree of bachelor in physic, he accompanied an English gentleman to Berne and Geneva.

It is undoubtedly fact, that this ingenious, unfortunate man, travelled on foot most part of his tour. He had left England with very little money; and, being of a philosophical turn, and at that time possessing a body capable of sustaining every fatigue, and a heart not easily terrified at danger, he became an enthusiast to the design he had formed of seeing the manners of different countries. He had some knowledge of the French language, and of music, and he played tolerably well on the German flute; which, from an amusement, became at some times the means of subsistence. His learning produced him a hospitable reception at most of the religious houses; and his music made him welcome to the peasants of Flanders and other parts of Germany. "Whenever I approached," he used to say, "a peasant's house towards night-fall, I played one of my most merry tunes; and that procured me not only a lodging, but subsistence for the next day: but in truth, (his constant expression), I must own, whenever I attempted to entertain persons of a higher rank, they always thought my performance odious, and never made me any return for my endeavours to please them."

On Mr Goldsmith's arrival at Geneva, he was recommended as a proper person for a travelling tutor to a young man, who had been unexpectedly left a considerable sum of money by his uncle Mr S—, formerly an eminent pawnbroker near Holborn. This youth, who had been articled to an attorney, on receipt of his fortune, determined to see the world; and, on his engaging with his preceptor, made a proviso, that he should be permitted to govern himself; and Goldsmith soon found his pupil understood the art of directing in money-concerns extremely well, as avarice was his prevailing passion. His questions were usually how money might be saved, and which was the least expensive course of travel; whether any thing could be bought that would turn to account when disposed of again in London? Such curiosities on the way as could be seen for nothing he was ready enough to look at; but, if the sight of them was to be paid for, he usually asserted, that he had been told they were not worth seeing. He never paid a bill that he would not observe how amazingly expensive travelling was; and all this, though he was not yet twenty-one. During Goldsmith's continuance in Switzerland, he assiduously cultivated his poetical talent, of which he had given some striking proofs while at the college of Edinburgh. It was here he sent the first sketch of his delightful poem, called the Traveller, to his brother the clergyman in Ireland, who, giving up fame and fortune, had retired, with an amiable wife, to happiness and obscurity, on an income of only 40 l. a year.

From Geneva Mr Goldsmith and his pupil visited the south of France; where the young man, upon some disagreement with his preceptor, paid him the small part of his salary which was due, and embarked at Marseilles for England. Our wanderer was left once more upon the world at large, and passed through a variety of difficulties in traversing the greatest part of

France. At length his curiosity being fatiated, he Goldsmith. bent his course towards England, and arrived at Dover, the beginning of the winter, in the year 1758. When he came to London, his stock of cash did not amount to two livres. An entire stranger in this metropolis, his mind was filled with the most gloomy reflections on his embarrassed situation. With some difficulty he discovered that part of the town in which his old acquaintance Dr Sleight resided. This gentleman received him with the warmest affection, and liberally invited him to share his purse till some establishment could be procured for him. Goldsmith, unwilling to be a burden to his friend, a short time after eagerly embraced an offer which was made him to assist the late Rev. Dr Milner, in instructing the young gentlemen at the academy at Peckham; and acquitted himself greatly to the doctor's satisfaction for a short time: but, having obtained some reputation by the criticisms he had written in the Monthly Review, Mr Griffith, the proprietor, engaged him in the compilation of it; and, resolving to pursue the profession of writing, he returned to London, as the mart where abilities of every kind were sure of meeting distinction and reward. As his finances were by no means in a good state, he determined to adopt a plan of the strictest economy, and took lodgings in an obscure court in the Old Bailey, where he wrote several ingenious little pieces. The late Mr Newberry, who at that time gave great encouragement to men of literary abilities, became a kind of patron to our young author; and introduced him as one of the writers in the Public Ledger, in which his Citizen of the World originally appeared, under the title of "Chinese Letters."

Fortune now seemed to take some notice of a man she had long neglected. The simplicity of his character, the integrity of his heart, and the merit of his productions, made his company very acceptable to a number of respectable families; and he emerged from his shabby apartments in the Old Bailey, to the polished air of the Temple, where he took handsome chambers, and lived in a genteel style. The publication of his Traveller, and his Vicar of Wakefield, was followed by the performance of his comedy of the Good-natured Man at Covent-Garden theatre, and placed him in the first rank of the poets of the present age.

Among many other persons of distinction who were desirous to know him, was the duke of Northumberland; and the circumstance that attended his introduction to that nobleman is worthy of being related, in order to shew a striking trait of his character. "I was invited," said the Doctor (as he was then universally called) "by my friend Mr Piercy, to wait upon the duke, in consequence of the satisfaction he had received from the perusal of one of my productions. I dressed myself in the best manner I could; and, after studying some compliments I thought necessary on such an occasion, proceeded to Northumberland-house, and acquainted the servants that I had particular business with his Grace. They shewed me into an antichamber; where, after waiting some time, a gentleman, very elegantly dressed, made his appearance. Taking him for the duke, I delivered all the fine things I had composed, in order to compliment him on the honour he had done me: when, to my great

great astonishment, he told me, I had mistaken him for his master, who would see me immediately. At that instant, the duke came into the apartment; and I was so confuted on the occasion, that I wanted words, barely sufficient to express the sense I entertained of the duke's politeness, and went away exceedingly chagrined at the blunder I had committed."

Another feature in his character we cannot help laying before the reader. Previous to the publication of his *Deserted Village*, the bookseller had given him a note for one hundred guineas for the copy, which the doctor mentioned, a few hours after, to one of his friends; who observed, it was a very great sum for so short a performance. "In truth," replied Goldsmith, "I think so too; I have not been easy since I received it; therefore I will go back and return him his note;" which he absolutely did, and left it entirely to the bookseller to pay him according to the profits produced by the sale of the piece, which turned out very considerable.

During the last rehearsal of his comedy, intitled, *She stoops to Conquer*, which Mr Coleman had no opinion would succeed, on the Doctor's objecting to the repetition of one of Tony Lumpkin's speeches, being apprehensive it might injure the play, the manager with great keenness replied, "Piha, my dear Doctor, do not be fearful of squibs, when we have been fitting almost these two hours upon a barrel of gunpowder." The piece, however, contrary to Mr Coleman's expectation, was received with uncommon applause by the audience; and Goldsmith's pride was so hurt by the severity of the above observation, that it entirely put an end to his friendship for the gentleman that made it.

Notwithstanding the great success of his pieces, by some of which it is asserted, upon good authority, he cleared 1800*l.* in one year, his circumstances were by no means in a prosperous situation; which was partly owing to the liberality of his disposition, and partly to an unfortunate habit he had contracted of gaming, the arts of which he knew very little of, and consequently became the prey of those who were unprincipled enough to take advantage of his simplicity.

Just before his death he had formed a design for executing an *Universal Dictionary of Arts and Sciences*, the prospectus of which he actually published. In this work several of his literary friends (particularly, Sir Joshua Reynolds, Dr Johnson, Mr Beauclerc, and Mr Garrick) had undertaken to furnish him with articles upon different subjects. He had entertained the most sanguine expectations from the success of it. The undertaking, however, did not meet with that encouragement from the booksellers which he had imagined it would undoubtedly receive; and he used to lament this circumstance almost to the last hour of his existence.

He had been for some years afflicted, at different times, with a violent strangury, which contributed not a little to embitter the latter part of his life; and which, united with the vexations which he suffered upon other occasions, brought on a kind of habitual despondency. In this unhappy condition he was attacked by a nervous fever, which, being improperly treated, terminated in his dissolution on the 4th of April 1774. His remains were privately deposited

in the Temple burial-ground.

As to his character, it is strongly illustrated by Mr Pope's line,

In wit a man, simplicity a child.

The learned leisure he loved to enjoy was too often interrupted by distresses which arose from the liberality of his temper, and which sometimes threw him into loud fits of passion: but this impetuosity was corrected upon a moment's reflection; and his servants have been known, upon these occasions, purposely to throw themselves in his way, that they might profit by it immediately after; for he who had the good fortune to be reproved, was certain of being rewarded for it. The universal esteem in which his poems were held, and the repeated pleasure they give in the perusal, is a striking test of their merit. He was a studious and correct observer of nature; happy in the selection of his images, in the choice of his subjects, and in the harmony of his versification; and, though his embarrassed situation prevented him from putting the last hand to many of his productions. His *Hermit*, his *Traveller*, and his *Deserted Village*, bid fair to claim a place among the most finished pieces in the English language.

Besides the works already mentioned, he wrote, 1. *History of the earth and animated nature*, 6 vols 8vo. 2. *History of England*, 4 vols 8vo. 3. *History of Rome*, 2 vols. 4. *Abridgements of the two last*, for the use of schools. 5. A view of experimental philosophy, 3 vols 8vo.; a posthumous work, not esteemed. 6. *Miscellanies*, &c.

GOLIUS (James), a celebrated professor of Arabic and the mathematics at Leyden, was descended from a very honourable family, and born at the Hague in the year 1596. He was put to the university of Leyden, where he studied under Erpinus; and having made himself master of all the learned languages, applied himself to the mathematics, physics, and divinity. He afterwards travelled into Africa and Asia; and became greatly esteemed by the king of Morocco, and the sultan of the Turks. He at length returned to Leyden, laden with manuscripts; and in 1624, succeeded Erpenius in the Arabic chair. As he had been an eye-witness of the wretched state of Christianity in the Mahometan countries, he was filled with the compassion of a fellow-Christian; and none ever solicited for a place of honour and profit with greater eagerness, than he for procuring a new edition of the New Testament, in the original language, with a translation into the vulgar Greek, by an Archimandrite; and as there are some of these Christians, who use the Arabic tongue in divine service, he also took care to have dispersed among them an Arabic translation of the Confession of the Protestants, together with the Catechism and Liturgy. In 1626, he was also chosen professor of mathematics; and discharged the functions of both professorships, with the greatest applause, during 40 years. He was likewise appointed interpreter in ordinary to the states for the Arabic, Turkish, Persian, and other eastern languages, for which he had an annual pension, and a present of a gold chain, with a very beautiful medal, which he wore as a badge of his office. He published, 1. *The life of Tamerlane*, written in Arabic. 2. *The history of the Saracens*, written by Elmacin. 3. *Alferganus's*

Goltzius
Gombroon

elements of astronomy, with a new version and learned commentaries. 4. An excellent Arabic lexicon. 5. A Persian Dictionary. He died in 1667.

GOLTZIUS (Henry), a famous engraver and painter, born in 1558, at Mulbreck, in the duchy of Juliers. His ill health induced him to travel; and to prevent his being known, he took the name of his man-servant, maintained by him for his skill in painting; by which stratagem he enjoyed the pleasure of hearing what was said of his works, without being known. Travelling restored his health for a while; but he relapsed, and died at Harlem in 1617. Mr Evelyn has given a strong testimony of his merit as an Engraver. As his works are very numerous, his execution must have been remarkably ready.

GOLTZIUS (Hubert), a learned German, born at Venlo in the duchy of Gueldres in 1526. His father was a painter, and himself was bred to the art under Lambert Lombard; but he did little at painting, or at least his pictures are very scarce; for having a peculiar turn to antiquities, he devoted himself to the study of medals. He travelled through Germany, France, and Italy, to make collections, as well as to draw from thence all the lights he could towards clearing up ancient history: he was the author of several excellent works, in which he was so accurate and nice, that he had them printed at his own house, under his own correction, and even engraved the plates and medals with his own hand. His veneration for Roman antiquities was so great, that he gave all his children Roman names; and married, for his second wife, the widow of the antiquarian Martinus Smetius; probably more for the sake of Smetius's medals and inscriptions, than for his own sake; and was punished accordingly by her plaguing him all his life, if he did not shorten it. He died in 1583.

GOMBAULD (John Ogier de), one of the best French poets in the 17th century, and one of the first members of the French academy, was born at St. Just de Lussac. He acquired the esteem of Mary de Medicis, and of the wits of his time. He was a Protestant, and died in a very advanced age. He wrote many works in verse and prose. His epigrams, and some of his sonnets, are particularly esteemed.

GOMBROON, by the natives called *Bander Abassi*, a city of Persia, situated in N. Lat. 27. 40. E. Long. 55. 30. The name of *Gombroon*, or *Comerong*, Captain Hamilton tells us, it had from the Portuguese; because it was remarkable for the number of prawns and shrimps caught on its coasts, by them called *comerong*. This city owes its wealth and grandeur to the demolition of Ormus, and the downfall of the Portuguese empire in the East-Indies. It is now justly accounted one of the greatest marts in the East, was built by the great shah Abas, and from him, as some think, obtained the name of *Bander-Abassi*, which signifies the court of Abas. It stands on a bay about nine leagues to the northward of the east end of the island of Kishmish, and three leagues from the famous Ormus. The English began to settle here about the year 1631, when, in consideration of their services against the Portuguese, shah Abas granted them half the customs of that port. This was confirmed by a phirmaund, and duly regarded, till the English began to neglect the services they had stipulated. Whether

the company has any emolument from the customs, at present, is what we cannot pretend to ascertain. The town is large, but its situation bad; wanting almost every thing that contributes to the happiness, and even support of life. Towards the land it is encompassed by a fort of wall; and towards the sea several small forts, with a platform, and a castle or citadel, mounted with cannon to secure it and the road from the attempts of an enemy by sea. The houses in most of the streets are so out of repair, some half down, others in a heap of rubbish, that a stranger would imagine the town had been sacked and ravaged by a barbarous people; not a vestige of the wealth really contained in the place appearing in view. The bazars and shops round them, are kept, for the most part, by Danians, whose houses are generally in good order. Most of the houses are built with earth and lime, but some of the best with stone. Many of them have a fort of ventilators at top, which contribute greatly to the health of the inhabitants in the hot seasons of the year. The most sickly months here are April, May, September, and October. With fish and mutton the inhabitants are well supplied. Rice is imported from India; and wheat is so plenty, that the poor subsist chiefly on bread and dates. The country hereabouts abounds in the most delicious fruits, as apricots, peaches, pomegranates, pears, mangoes, grapes, quavas, plumbs, sweet quinces, and water-melons. The apricots, however, are small, and extremely dangerous if eaten to excess.

Those conveniences are more than overbalanced by the scarcity of fresh water, with which the inhabitants are supplied from Affeen, a place seven miles distant, there not being a spring or well in the town. Persons of condition keep a camel constantly employed in bringing fresh and wholesome water. Captain Hamilton gives it as his opinion, that one cause of the unwholesomeness of this city is the reflection of the rays of light from a high mountain to the north of it. He says, that when the beams are reflected from this mountain, they almost fire the air, and, for two or three months in the year, render the situation intolerable. For this reason the people of condition retire into the country, to pass the heats of June, July, and August. The very fea, during this season, is affected, inasmuch that the stench is no less disagreeable than that of putrid carcases; and this is increased by the quantities of shell-fish left on the shore, from which an exhalation arises that taints gold and silver, and is less tolerable than the bilge-water of a tight ship. At Affeen the English factory have a country-house and gardens, to which they retire occasionally. Here they have whole groves of Seville orange-trees, which, though not natural to the country, thrive very well, and are always verdant, bearing ripe and green fruit, with blossoms, all at the same time. They have likewise tanks and ponds of fine fresh water, with every thing else that can moderate the heat of the climate, and render life agreeable and elegant. About ten miles from Affeen is a place called *Minoa*, where are cold and hot natural baths, reckoned infallible in the cure of all scrophulous disorders, rheumatisms, and other diseases, by bathing.

Gombroon is extremely populous, on account of the commerce carried on by the Dutch and English factories,

Gombroon

Gomera
Gomphrena.
na.

factories, as well as the natives. The English factory is close by the sea, at some distance from the Dutch, which is a commodious and fine new building. A great part of the company's profit arises from freights. As the natives have not one good ship of their own, and are extremely ignorant of navigation, they freight their goods for Surat, and other Indian marts, in English and Dutch bottoms, at an exorbitant rate. The commodities of the Gombroon market are, fine wines of different kinds, raisins, almonds, kish-mishes, prunellas, dates, pistachio-nuts, ginger, filks, carpets, leather, tutty, galbanum, ammoniac, alafatida, tracaganth, with other gums, and a variety of shop medicines. There are in a great measure the produce of Carmania, which they bring to Gombroon in caravans. The English company had once a small factory in the province of Carmania, chiefly for the sake of a fine wool produced there, and used by the hatters. The said company had once a project of carrying a breed of the Persian goats to St Helena; but whether it was executed, or what success it met with, we cannot say. Although the company pay no customs, yet they usually make a present to the shabander, to avoid the trouble he has it in his power to give them. All private traders with the company's palles, enjoy the same privileges, on paying two *per cent.* to the company, one to the agent, and one to the broker. All private trade, either by European or country ships, has long been engrossed by the company's servants.

GOMERA, one of Canary islands lying between Ferro and Teneriffe. It has one good town of the same name, with an excellent harbour, where the Spanish fleet often take in refreshments. They have corn sufficient to supply the inhabitants, with one sugar-work, and great plenty of wine and fruits. It is subject to the Spaniards, who conquered it in 1445. W. Long. 17. 10. N. Lat. 28. 0.

GOMORRAH, (anc. geog.) one of the cities of the plain or of the vale of Siddim in Judæa, destroyed together with Sodom by fire from heaven, on account of the wickedness of the people. To determine its particular situation at present, is impossible.

GOMORRO islands. See COMORA.

GOMPHOSIS, in anatomy, that kind of articulation by which the teeth are fixed in the jaw-bone. See ANATOMY, n° 2. c.

GOMPHRENA, GLORE AMARANTH, a genus of the digynia order, belonging to the pentandria class of plants. There are seven species; but only one of them is commonly cultivated in our gardens, viz. the globosa. It hath an upright stalk branching all round, two or three feet high, garnished with oval, lanceolate, and opposite leaves; and every branch and side-shoot terminated by a close globular head of flowers, composed of numerous, very small starchy florets closely covered with dry scaly calices placed *imbricatum*, persistent, and beautifully coloured purple, white, red, or striped and variegated. The flowers themselves are so small, and closely covered with the scaly calices, that they scarcely appear. The numerous closely placed scaly coverings being of a dry, firm, consistence, coloured and glittering, collected into a compact round head, about the size of an ordinary cherry, make a fine appearance. They are annual plants,

natives of India; and require artificial heat to raise and forward them to a proper growth, so that they may flower in perfection, and produce ripe seed. They flower from June to November; and if the flowers are gathered when at full growth, and placed out of the sun, they will retain their beauty several months.

GONDI (John Francis Paul), cardinal de Retz, was the son of Philip Emmanuel de Gondi, count de Joigny, lieutenant-general, &c. and was born in 1613. From a doctor of the Sorbonne, he first became coadjutor to his uncle John Francis de Gondi, whom he succeeded in 1654 as archbishop of Paris; and was finally made a cardinal. This extraordinary person has drawn his own character in his memoirs with impartiality. He was a man who, from the greatest degree of debauchery, and still languishing under its consequences, made himself adored by the people as a preacher. At the age of 23, he was at the head of a conspiracy against the life of cardinal Richelieu; he precipitated the parliament into cabals, and the people into sedition: he was, says M. Voltaire, the first bishop who carried on a civil war without the mask of religion. However, his intrigues and schemes turned out so ill, that he was obliged to quit France; and he lived the life of a vagrant exile for five or six years, till the death of his great enemy cardinal Mazarin, when he returned on certain stipulated conditions. After assisting in the conclave at Rome, which chose Clement IX. he retired from the world, and ended his life like a philosopher in 1679; which made Voltaire say, that in his youth he lived like Catiline, and like Atticus in his old age. He wrote his Memoirs in his retirement; the best edition of which is that of Amsterdam, 4 vols. 12mo. 1719.

GONORRHÆA, an effluvia of white, greenish, or differently-coloured matter from the urethra; most commonly owing to venereal infection. See (Index subjoined to) MEDICINE, and SURGERY.

GONZAGA (Lucretia), was one of the most illustrious ladies of the 16th century; and much celebrated for her wit, her learning, and her delicate style. Hortensio Lando wrote a beautiful panegyric upon her, and dedicated to her his dialogue of moderating the passions. Her beautiful letters have been collected with the greatest care. We learn from these, that her marriage with John Paul Manfrone was unhappy.—She was married to him when he was not 14 years of age, and his conduct afterwards gave her infinite uneasiness. He engaged in a conspiracy against the duke of Ferrara; was detected and imprisoned by him; but, though condemned by the judges, not put to death. She did all in her power to obtain his enlargement, but in vain; for he died in prison, having shewn such impatience under his misfortunes, as made it imagined he had lost his senses. She never would listen afterwards to any proposals of marriage, though several were made to her. All that came from her pen was so much esteemed, that a collection was made even of the notes she writ to her servants; several of which are to be met with in the edition of her letters.

GONDOLA, a sort of barge curiously ornamented, and navigated on the canals of Venice; also a passage-boat, of six or eight oars, in other parts of the coasts of Italy.

Gondi
Gondola.

Good.

GOOD, in general, whatever is apt to increase pleasure, or diminish pain in us; or, which amounts to the same, whatever is able to procure or preserve to us the possession of agreeable sensations, and remove those of an opposite nature.

Moral Good denotes the right conduct of the several senses and passions, or their just proportion and accommodation to their respective objects and relations. See **MORALS**.

Good Abearing, (*bonus gestus*), signifies an exact carriage or behaviour of a subject towards the king and the people, whereunto some persons upon their misbehaviour are bound: and he that is bound to this, is said to be more strictly bound than to the peace; because where the peace is not broken, the surety *de bono gestu* may be forfeited by the number of a man's company, or by their weapons.

Good Behaviour, in law, an exact carriage and behaviour to the king and his people.

A justice of the peace may, at the request of another, or where he himself sees cause, demand surety for the good behaviour; and to that end the justice may issue out his warrant against any persons whatsoever, under the degree of nobility; but when it is a nobleman, complaint is to be made in the court of chancery, or king's-bench, where such nobleman may be bound to keep the peace. Infants and feme-coverts, who ought to find surety by their friends, may be bound over to their good behaviour; as also lunatics, that have sometimes lucid intervals, and all others who break the peace, or being suspected to do it, by affrays, assaults, battery, wounding, fighting, quarrelling, threatening, &c. A person may be likewise bound to his good behaviour for a scandalous way of living, keeping bawdy-houses, gaming-houses, &c. and so may common drunkards, whoremongers, common whores, cheats, libellers, &c. He who demands surety for the peace, on any violence offered, must take an oath before the justice, that he goes in fear of his life, or some bodily harm, &c. and that it is not out of malice, but from a regard to his own safety.

Good-Friday, a fast of the Christian church, in memory of the sufferings and death of Jesus Christ. It is observed on the Friday in *holy or passion week*; and it is called, by way of eminence, *good*, because of the blessed effects of our Saviour's sufferings, which were a propitiatory or expiating sacrifice for the sins of the world. The commemoration of our Saviour's sufferings has been kept from the very first ages of Christianity, and was always observed as a day of the strictest fasting and humiliation. Among the Saxons it was called *Long-Friday*; but for what reason, except on account of the long fastings and offices then used, is uncertain. On Good-Friday the Pope sits on a plain form; and, after service is ended, when the cardinals wait on him back to his chamber, they are obliged to keep a deep silence, as a testimony of their sorrow. In the night of Good-Friday, the Greeks perform the obsequies of our Saviour round a great crucifix, laid on a bed of state, adorned with flowers: these the bishops distribute among the assistants, when the office is ended. The Armenians, on this day, set open a holy sepulchre, in imitation of that of mount Calvary.

Good-Hope, or *Cape of Good-Hope*, the most south-

erly promontory of Africa, where the Dutch have built a good town and fort. It is situated in the country of the Hottentots. See **HOTTENTOTS**.

Good Manners. See **MANNERS**.

GOOSE, in ornithology. See **ANAS**.

GOOSE-Andery, in ornithology. See **MERCUS**.

GOOSE-Berry, in botany. See **RIBES**.

GOOSE-Neck, in a ship, a piece of iron fixed on the one end of the tiller, to which the laniard of the whip-staff or the wheel-rope comes, for steering the ship.

GOOSE-Wing, in the sea-language. When a ship fails before, or with a quarter-wind on a fresh gale, to make the more haste, they lanch out a boom, and sail on the lee-side; and a sail so fitted, is called a *goose-wing*.

GORCUM, a town of the United Provinces, in South Holland, which carries on a considerable trade in cheese and butter. It is situated on the rivers Lingne and Maeße, in E. Lon. 4. 55. N. Lat. 51. 49.

GORDIANUS I. (Roman general,) was for his valour and virtues, chosen emperor by the army in the reign of Maximinus, A. D. 237; but his son, whom he had associated with himself in the throne, being slain by Capellian, the governor of Mauritania for Maximinus, Gordianus killed himself the same year. See **ROME**.

GORDIANUS III. (grandson of the former), a renowned warrior, and styled *The guardian of the Roman commonwealth*. He was treacherously assassinated by Philippus, an Arabian, one of his generals; who, to the eternal disgrace of the Romans of that æra, succeeded him in the empire, A. D. 244. See **ROME**.

GORDIAN-Knot, in antiquity, a knot made in the leathers or harness of the chariot of Gordius king of Phrygia, so very intricate, that there was no finding where it began or ended. The inhabitants had a tradition, that the oracle had declared, that he who untied this knot should be master of Asia. Alexander having undertaken it, was unable to accomplish it; when fearing lest his not untying it should be deemed an ill augury, and prove a check in the way of his conquests, he cut it asunder with his sword, and thus either accomplished or eluded the oracle.

GORDIUS, the HAIR-WORM, a genus of insects belonging to the class of *vermes intestina*. There are two species, 1. The aquaticus, with a silflim body, of equal thickness, and smooth. It hath a pale colour, with both the ends black; and inhabits boggy places, and clay at the bottom of water. 2. The argillaceus is of an uniform yellow colour, twisted spirally, and lying flat. It is common in the intestines of herring, and other sea-fish. Aristotle remarks, that the ballerus and tillo are infested in the dog-days with a worm that torments them so much, that they rise to the top of the water, where the heat destroys them. To these worms also may probably be owing the agonies to which the bleaks are at certain times subject. See **CYPRINUS**.

GORDIUS, king of Phrygia, and father of Midas, was a poor husbandman, with two yokes of oxen, where-with he ploughed his land and drew his wain. An eagle sitting a long while upon one of his oxen, he consulted the soothsayers; a virgin bid him sacrifice

to

Goose

Gordius.

Jacob's
Law Dist.

Gordon
||
Gorget.

to Jupiter in the capacity of king. He married the virgin, who brought forth Midas. The Persians instructed by the oracle to fet the first person they met in a wain upon the throne, met Gordius, and made him king. Midas for this good fortune dedicated to Jupiter his father's cart. The knot of the yoke, they say, was so well twisted, that he who could unloose it was promised the empire of Asia; hence the proverb of *the Gordian knot* had its origin. See GORDIAN Knot.

GORDON (Thomas) noted for his translations and political writings, was born at Kirkcudbright in North-Britain. He came young to London; where he supported himself by teaching languages, until he procured employment under the earl of Oxford in queen Anne's time, but in what capacity is not now known. He first distinguished himself in the defence of Dr Hoadley in the Bangorian controversy; which recommended him to Mr Trenchard, in conjunction with whom he wrote the well-known *Cato's Letters*, upon a variety of important public subjects. These were followed by another periodical paper, under the title of *The Independent Whig*; which was continued some years after Mr Trenchard's death, by Gordon alone, against the hierarchy of the church; but with more acrimony than was shewn in *Cato's Letters*. At length Sir Robert Walpole retained him to defend his administration, to which end he wrote several pamphlets; and died first commissioner of the wine-licences in 1750. There are two other collections of tracts of his writing, *The cordial for low spirits*, and *The pillars of priesthood and orthodoxy spoken*. In his translations of *Sally's* and other works, he places the verbs at the ends of sentences, according to the Latin idiom, in a very stiff and affected manner.

GORE, in heraldry, one of the abatements, which, according to Gullim, denotes a coward. It is a figure consisting of two arch lines drawn one from the sinister chief, and the other from the sinister base, both meeting in an acute angle in the middle of the fess point. See HERALDRY.

GOREE, a small island of Africa, near Cape de Verd, subject to the French. It is barren, but of great importance on account of its good trade. It was taken by the English in May 1759, and given up by the treaty of peace in 1763. E. Long. 12. 25. N. Lat. 14. 30.

GOREE, the capital town of an island of the same name in Holland, eight miles South of Briel. E. Long. 3. 50. N. Lat. 51. 55.

GORGE, in architecture, the narrowest part of the Tuscan and Doric capitals, lying between the astragal, above the shaft of the pillar, and the annulets.

GORGE, in fortification, the entrance of the platform of any work. See FORTIFICATION.

GORGED, in heraldry, the bearing of a crown, coronet, or the like, about the neck of a lion, a swan, &c. and in that case it is said, the lion or cygnet is *gorged* with a dual coronet, &c.

Gorged is also used when the gorge or neck of a peacock, swan, or the like bird, is of a different colour or metal from the rest.

GORGET, a kind of breast-plate like a half moon, with the arms of the prince thereon; worn by the officers of foot. They are to be either gilt or silver, ac-

cording to the colour of the buttons on the uniforms.

GORGONS, in antiquity. Authors are not agreed in the accounts they give of the Gorgons. Diodorus Siculus will have the Gorgons and Amazons to have been two warlike nations of women who inhabited that part of Libya which lay on the lake Tritonidis. We may well imagine, says that author, that they had frequent quarrels together; as being women and neighbours. He goes on to give an account of a most bloody engagement between them, wherein the Amazons had the better; three thousand of the Gorgons being made prisoners, and the rest obliged to take shelter in a wood, to which the Amazons set fire, with an intention to destroy the whole nation of Gorgons; but as the wind did not prove favourable, they were obliged to desist, and retire to their own territories. Here the Amazons, intoxicated with their victory, gave themselves up to feasting and mirth; and as the guard was very negligently kept in the night-time, the 3000 prisoners laid hold of the opportunity, and, seizing the swords of these imprudent females, massacred a great number of them; but were themselves at last overpowered and cut to pieces. Myrine, the queen of the Amazons, caused monuments to be erected to her female warriors who had been slain on this occasion; which monuments were still to be seen, says our author, in his days. These female nations are said to have been exterminated by Hercules.

Pausanias's account of the Gorgons is much to the same purpose. They were, says he, the daughters of Phorbus; after whose death one of them, named *Medusa*, reigned over the people dwelling near the lake Tritonidis. The queen was passionately fond of hunting and war, so that she laid the neighbouring countries quite waste. At last, Perseus having made war on the Gorgons, and killed the queen herself, when he came to take a view of the field of battle, he found the queen's corpse so extremely beautiful, that he ordered her head to be cut off, which he carried home with him to shew to his countrymen the Greeks, who could not behold it without astonishment.

These accounts appear somewhat credible; but others represent the Gorgons in a very incredible manner, making them to be a kind of monstrous women, all covered over with hair, who lived in woods and forests. Others again, make them a kind of animal resembling a sheep, with such long hair on their faces, that it required their utmost efforts to clear it away before they could see any thing; but when once they had effected this, they killed all they saw with the poisonous influence of their eyes.

GORGONA, a small island of Italy, in the sea of Tuscany, and near that of Corsica, about eight miles in circumference; remarkable for the large quantity of anchovies taken near it. E. Long. 10. 0. N. Lat. 43. 22.

GORGONA, a small island of the South Sea, 12 miles West of the coast of Peru, in America. It is indifferent high land, very woody, and some of the trees are very tall and large, and proper for masts. It is about 10 miles in circumference, and has several springs and rivulets of excellent water, but is subject to constant rains. W. Long. 79. 3. S. Lat. 3. 30.

GORITIA, or GORITZ, a strong town of Germany, in the circle of Austria, and duchy of Carniola, with

Gorgons
||
Goritia.

with a castle; seated on the river Lizonzo, 20 miles north-east of Aquileia, and 70 north-east of Venice. E. Long. 13. 43. N. Lat. 46. 12.

GORLITZ, a town of Germany, in Upper Lusatia, subject to the elector of Saxony. It is a handsome strong place, and seated on the river Niesse, in E. Long. 15. 15. N. Lat. 51. 10.

GOSHAWK. See **FALCO**.

GOSLAR, a large and ancient town of Lower Saxony, and in the territory of Brunswick; it is a free imperial city, and it was here that gun-powder was first invented, by a monk as is generally supposed. It is a large place, but the buildings are in the ancient taste. In 1728, 280 houses, and St Stephen's fine church, were reduced to ashes. It is seated on a mountain, near the river Gose, and near it are rich mines of iron. The inhabitants are famous for brewing excellent beer. E. Long. 3. 37. N. Lat. 51. 55.

GOSPEL, the history of the life, actions, death, resurrection, ascension, and doctrine of Jesus Christ.

The word is Saxon, and of the same import with the Latin term *evangelium*, which signifies glad tidings, or good news.

This history is contained in the writings of St Matthew, St Mark, St Luke, and St John; who from thence are called *evangelists*. The Christian church never acknowledged any more than these four gospels as canonical; notwithstanding which, several apocryphal gospels are handed down to us, and others are entirely lost.

GOSSYPIMUM, or **COTTON**, a genus of the polyandria order belonging to the monodelphia class of plants. There are four species, all of them natives of warm climates. 1. The herbaceous, or common herbaceous cotton, hath an herbaceous smooth stalk two feet high, branching upwards; five-lobed smooth leaves; and yellow flowers from the ends of the branches, succeeded by roundish capsules full of seed and cotton. 2. The hirsutum, or hairy American cotton, hath hairy stalks branching laterally two or three feet high; palmated, three and five lobed hairy leaves; and yellow flowers, succeeded by large oval pods furnished with seeds and cotton. 3. The barbadense, or Barbadoes shrubby cotton, hath a shrubby stalk branching four or five feet high, three-lobed smooth leaves, glandulous underneath; and yellow flowers succeeded by oval pods, containing seeds and cotton. 4. The arboreum, or tree-cotton, hath an upright woody perennial stalk, branching six or eight feet high; palmated, four or five lobed smooth leaves; and yellow flowers, succeeded by large pods filled with seeds and cotton.

The first three species are annual, but the fourth is perennial both in root and stalk. In warm countries these plants are cultivated in great quantities in the fields for the sake of the cotton they produce; but the first species is most generally cultivated. The pods are sometimes as large as middling-sized apples, closely filled with the cotton surrounding the seed. When these plants are raised in this country, they must be continually kept in a warm stove, where they will produce seeds and cotton. They are propagated by seeds. See **COTTON**.

The American Islands produce cotton shrubs of various sizes, which rise and grow up without any culture; especially in low and marshy grounds. Their

produce is of a pale red; some paler than others; but so short that it cannot be spun. None of this is brought to Europe, though it might be usefully employed in making of hats. The little that is picked up, serves to make mattresses and pillows.

The cotton-shrub that supplies our manufactures, requires a dry and stony soil, and thrives best in grounds that have already been tilled. Not but that the plant appears more flourishing in fresh lands than in those which are exhausted; but, while it produces more wood, it bears less fruit.

A western exposure is fittest for it. The culture of it begins in March and April, and continues during the first spring-rains. Holes are made at seven or eight feet distance from each other, and a few seeds thrown in. When they are grown to the height of five or six inches, all the stems are pulled up, except two or three of the strongest. These are cropped twice before the end of August. This precaution is the more necessary, as the wood bears no fruit till after the second pruning; and, if the shrub was suffered to grow more than four feet high, the crop would not be the greater, nor the fruit so easily gathered. The same method is pursued for three years; for so long the shrub may continue, if it cannot conveniently be renewed oftener with the prospect of an advantage that will compensate the trouble.

This useful plant will not thrive if great attention is not paid to pluck up the weeds that grow about it. Frequent rains will promote its growth; but they must not be incessant. Dry weather is particularly necessary in the months of March and April, which is the time of gathering the cotton, to prevent it from being discoloured and spotted.

When it is all gathered in, the seeds must be picked out from the wool with which they are naturally mixed. This is done by means of a cotton-mill; which is an engine, composed of two rods of hard wood, about 18 feet long, 18 lines in circumference, and fluted two lines deep. They are confined at both ends, so as to leave no more distance between them than is necessary for the seed to slip through. At one end is a kind of little millstone, which, being put in motion with the foot, turns the rods in contrary directions. They separate the cotton, and throw out the seed contained in it.

GOTHA, a town of Germany, in the circle of Upper Saxony, and capital of a duchy of the same name. It is 15 miles west of Erford, and 15 south-east of Mulhausen. E. Long. 11. 0. N. Lat. 52. 25.

GOTHARD, one of the highest mountains of Switzerland; and from the top, where there is an hospital for monks, is one of the finest prospects in the world. It is eight miles from Aldorf.

GOTHIC, in general, whatever has any relation to the Goths; thus, we say, Gothic customs, Gothic architecture, &c.

GOTHLAND, the most southern province of Sweden, being a peninsula, encompassed on three sides by the Baltic Sea, or the channel at the entrance of it. It is divided into several parts, which are East Gothland, West Gothland, Smaland, Halland, Blekinge, and Schonen. It was a long time in the possession of the kings of Denmark, but was ceded to Sweden in 1654. The principal towns of Gothland are Calmar, Landskron,

fcröon, Christianople, Daleburg, Gothenburg, Helmat, Lunden, Malmone, and Vexio.

GOTHS, a warlike nation, and above all others famous in the Roman history, came originally out of Scandinavia, (the name by which the ancients distinguished the present countries of Sweden, Norway, Lapland, and Finmark.) According to the most probable accounts, they were the first inhabitants of those countries; and from thence sent colonies into the islands of the Baltic, the Cimbrian Cherfoneus, and the adjacent places yet destitute of inhabitants. The time of their first settling in Scandinavia, and the time when they first peopled with their colonies the abovementioned islands and Cherfoneus, are equally uncertain; though the Gothic annals suppose the latter to have happened in the time of Serug the great-grandfather of Abraham. This first migration of the Goths is said to have been conducted by their king Eric; in which all the ancient Gothic chronicles, as well as the Danish and Swedish ones, agree. Their second migration is supposed to have happened many ages after; when, the abovementioned countries being overstocked with people, Berig, at that time king of the Goths, went out with a fleet in quest of new settlements. He landed in the country of the Ulmerugians, now Pomerania, drove out the ancient inhabitants, and divided their lands among his followers. He fell next upon the Vandals, whose country bordered on that of the Ulmerugians, and overcame them; but instead of forcing them to abandon their country, he only made them share the possessions with the Goths.

The Goths who had settled in Pomerania and the adjacent parts of Germany being greatly increased, inasmuch that the country could no longer contain them, they undertook a third migration in great numbers, under Filimer surnamed the Great, their fifth prince after leaving Scandinavia; and taking their route eastward, entered Scythia, advanced to the Cimmerian Bosphorus, and, driving out the Cimmerians, settled in the neighbourhood of the Palus Meotitis. Thence in process of time, being greatly increased in Scythia, they resolved to seek new settlements; and accordingly, taking their route eastward, they traversed several countries, and at length returned into Germany.

Their leader in this expedition was the celebrated Woden, called also *Voden, Othen, Oden, Godan*, and *Guadan*. Of this Woden many wonderful things are related in the Sæco-gothic chronicles. He was king of the Afgardians, whom the northern writers will have to be the same with a people called *Aspurgians* mentioned by Strabo and Ptolemy. By Strabo they are placed near the Cimmerian Bosphorus. Aspurgia was the metropolis of a province which Strabo calls *Asia*; and Woden and his followers are styled by the ancient Gothic writers *Aise, Aisane*, and *Aisote*. The kings of Aspurgia were masters of all that part of Scythia which lay to the westward of Imaus, and was by the Latins called *Scythia intra Imaum*, or "Scythia within Imaus."

At what time Woden reigned in this country, is quite uncertain; but all historians agree, that he went out in quest of new settlements with incredible numbers of people following him. He first entered Roxolania, comprehending the countries of Prussia, Livonia, and great part of Muscovy. From thence he went

Vol. V.

by sea into the north parts of Germany; and having reduced Saxony and Jutland, he at last settled in Sweden, where he reigned till his death, and became so famous that his name reached all countries, and he was by the northern nations worshipped as a god. He is supposed to have brought with him the Runic characters out of Asia, and to have taught the northern nations the art of poetry; whence he is styled the father of the Scaldi or Scaldri, their poets, who described in verse the exploits of the great men of their nation, as the bards did among the Gauls and Britons.

The Romans distinguished the Goths into two classes; the Ostrogoths and Visigoths. These names they received before they left Scandinavia, the *Visigoths* being softened by the Latins from *Westerogothi*, or those who inhabited the Western part of Scandinavia, as the Ostrogoths were those who inhabited the eastern part of that country. Their history affords nothing of moment till the time of their quarrelling with the Romans; which happened under the reign of the emperor Caracalla, son to Severus. After that time their history becomes so closely interwoven with that of the Romans, that for the most remarkable particulars of it we must refer to the article *ROME*. After the destruction of the Roman empire by the Heruli, the Ostrogoths, under their king Theodoric, became masters of the greatest part of Italy, having overcome and put to death Odoacer king of the Heruli in 494. They retained their dominion in this country till the year 553; when they were finally conquered by Narfes, the emperor Justinian's general. See (History of) *ITALY*. The Visigoths settled in Spain in the time of the emperor Honorius, where they founded a kingdom which continued till the country was subdued by the Saracens; for a particular account of all which, see the article *SPAIN*.

The Goths were famous for their hospitality and kindness to strangers, even before they embraced the Christian religion. Nay, it is said, that from their being eminently good, they were called *Gothi* by the neighbouring nations; that name, according to Grotius and most other writers, being derived from the German word *guten*, which signifies "good." They encouraged, says Dio, the study of philosophy above all other barbarous or foreign nations, and often chose kings from among their philosophers. Polygamy was not only allowed but countenanced among them; every one being valued or respected according to the number of his wives. By so many wives they had an incredible number of children, of whom they kept but one at home, sending out the rest in quest of new settlements; and hence those swarms of people which overran so many countries. With them adultery was a capital crime, and irremissibly punished with death. This severity, and likewise polygamy, prevailed among them when they were known to the Romans only by the name of *Geter*, (their most ancient name); as appears from the poet Menander, who was himself one of that nation; and from Horace, who greatly commends the chastity of their women. Their laws fell little short of those of the ancient Romans. Their government was monarchical; their religion was much the same with that of the ancient Germans or Celtes; and their dress is described by Apollinaris Sidonius in the following words: "They are shod (says he) with high

19 F

shoes

Gothofred
Gottenburg

Gottorp
Gourgues.

shoes made of hair, and reaching up to their ankles; their knees, thighs, and legs, are without any covering; their garments of various colours scarce reaching to the knee; their sleeves only cover the top of their arms; they wear green cassocks with a red border; their belts hang on their shoulder; their ears are covered with twisted locks, they use hooked lances and missile weapons."

GOTTHOFRED, or **GODFREY**, (Denis or Dionysius) an eminent civil lawyer, born of an illustrious house at Paris, in 1549. Finding his country involved in the confusion of the leaguers, he accepted of a professor's chair at Geneva, until he was patronized and employed by Henry IV.; but being afterward stripped of his employments as a huguenot, he at length retired to Heidelberg, from whence no offers were able to detach him. He was, however, disappointed of his intention to end his days there; for the disturbances that broke out in the Palatinate obliged him, in 1621, to take refuge in Straßburg, where he died the following year. He wrote a great number of books; but his principal work is the *Corpus Juris Civilis cum notis*.

GOTTHOFRED (Thodore), son of the former, was born at Geneva, in 1580. As soon as he had finished his studies, he went to Paris; where he conformed to the Romish religion, and applied with indefatigable industry to the study of history, that of France particularly, wherein he became very eminent, as appears by his works. In 1632, the king made him one of his historiographers, with a stipend of 3000 livres; and, in 1636, he was sent to Cologne, to assist at the treaty of peace negotiating there, on the part of France, by the cardinal of Lyons. This treaty being removed to Munster, Gothofred was sent thither, where he drew up Memoirs on the subject; and continued in that city, in the king's service, to his death in 1649. His principal work is his *Account of the Ceremonial of the kings of France*.

GOTTHOFRED (James), brother of the preceding, was born at Geneva, in 1587. Applying himself to the study of the law, he obtained the professor's chair there, was made counsellor of the city, and was several times employed in France, Germany, Piedmont, and Switzerland, to negotiate their affairs in the name of the republic. He died in 1562; and his chief work is his *Codex Theodosianus, cum perpetuis commentariis, &c.*

GOTTHOFRED (Denis), son of Theodore above mentioned, was born at Paris, in 1615. He studied history, after his father's example; became as eminent in that department of knowledge; and obtained the reversion of his father's place of historiographer royal, from Lewis XIII. when he was but 25 years of age. He published his father's *Ceremonial of France*; finished his *Memoirs of Philip de Commines*; and was preparing a *History of Charles VIII.* when he died in 1681. It was published by his eldest son, Denis, in 1684.

GOTTENBURG, a rich and strong town of West Gothland, in Sweden, with a good harbour, at the mouth of the river Gothebä; which is the best situated for foreign trade of any in Sweden, as it lies without the sound. E. Lon. 11. 50. N. Lat. 57. 44.

GOTTINGEN, a considerable town of Lower

Saxony, in Germany, and in the duchy of Brunswick; formerly free and imperial, but now subject to the elector of Hanover. Here his late Majesty, George II. founded an university. It is seated on the river Leine, in E. Lon. 10. 5. N. Lat. 51. 32.

GOTTORP, a town of the duchy of Hefwick, in Denmark, and capital of the duchy of Holstein Gottorp, where the duke has a very fine palace.

GOUDA, or **TURGOW**, a considerable town of South Holland, in the United Provinces, remarkable for its stately church. It is seated on the river IJssel, in E. Lon. 4. 37. N. Lat. 52. 2.

GOVERNMENT, in general, is the polity of a state, or an orderly power constituted for the public good.

Civil government was instituted for the preservation and advancement of mens civil interests, and for the better security of their lives, liberties, and properties. The use and necessity of government is such, that there never was an age or country without some sort of civil authority: but as men are seldom unanimous in the means of attaining their ends, so their differences of opinion in relation to government has produced a variety of forms of it. To enumerate them, would be to recapitulate the history of the whole earth. But, according to Montesquieu, and most other writers, they may in general be reduced to one of these three kinds. 1. The republican. 2. The monarchical. 3. The despotic.—The first is that, where the people in a body, or only a part of the people, have the sovereign power: the second, where one alone governs, but by fixed and established laws: but, in the despotic government, one person alone, without law and without rule, directs every thing by his own will and caprice. See the article *LAW*, n^o 1. 3.—10.—On the subject of government at large, see Montesquieu's *L'Esprit des Loix*, l. 2. c. 1.; Locke, ii. 129, &c. quarto edition, 1768; Sidney on Government; Sir Thomas Smith *de Repub. Angl.*; and Acherly's *Britannic Constitution*.—As to the Gothic government, its original and faults, &c. see Montesquieu's *L'Esprit des Loix*, l. 11. c. 8.—With respect to the feudal policy, how it limited government; see *FEUDAL System*.

GOVERNMENT is also a post or office, which gives a person the power or right to rule over a place a city, or a province, either supremely, or by deputation.

GOVERNMENT is likewise used for the city, country, or place to which the power of governing is extended.

GOULART (Simon), a famous minister of Geneva, was born at Senlis, in 1543; and was one of the most indefatigable writers of his time. He made considerable additions to the Catalogue of witnesses of the truth, composed by Illyricus; and acquired a great reputation by his works, the principal of which are, 1. A translation of Seneca. 2. A collection of memorable histories. 3. A translation of St Cyprian *De lapsis*. 4. Several devotional and moral treatises. He died at Geneva in 1628.

GOURD, in botany. See *CUCURBITA*.

GOURGUES (Dominique de), an illustrious French patriot, a private gentleman of Gascony. The Spaniards having inhumanly massacred a colony of Frenchmen who had settled in Florida, Gourgues took a severe revenge on them, an account of which is gi-

Gournay
Gown.

ven under the article FLORIDA. On his return, he was received with acclamations by his countrymen, but was forbid to appear at court. Queen Elizabeth invited him to command an English fleet against the Spaniards, in 1593; but he died at Tours, in his way to England.

GOURNAY, a town of France, in the duchy of Normandy and territory of Bray, celebrated for its butter-market. It is seated on the river Epte, in E. Lon. o. 33. N. Lat. 49. 25.

GOURNAY (Mary de Jars de), a lady celebrated for her learning, was the daughter of William de Jars, lord of Neuvi and Gournay. After the death of her father, she was protected by Montaigne and Cardinal Richlieu. To the daughter of the former she dedicated her *Nofegay of Pindus*; and composed several other works, the most considerable of which is *Les Avis*. She died at Paris in 1685, aged 80. The critics are divided concerning the reputation of this lady: by some she is styled the *Syren of France*; others say her works should have been buried with her.

GOUT. See (Index subjoined to) MEDICINE.

GOWER (John), one of our most ancient English poets, was cotemporary with Chaucer, and his intimate friend. Of what family, or in what country he was born, is uncertain. He studied the law, and was some time a member of the society of Lincoln's inn, where his acquaintance with Chaucer began. Some have asserted that he was a judge; but this is by no means certain. In the first year of Henry IV. he became blind; a misfortune which he laments in one of his Latin poems. He died in the year 1402; and was buried in St Mary Overie, which church he had rebuilt, chiefly at his own expence, so that he must have lived in affluent circumstances. His tomb was magnificent, and curiously ornamented. It still remains, but hath been repaired in later times. From the collar of SS, round the neck of his effigies, which lies upon the tomb, it is conjectured that he had been knighted. As to his character as a man, it is impossible, at this distance of time, to say any thing with certainty. With regard to his poetical talents, he was undoubtedly admired at the time when he wrote, though a modern reader may find it difficult to discover much harmony or genius in any of his compositions. He wrote, 1. *Speculum meditantis*, in French; in ten books. There are two copies of this in the Bodleian library. 2. *Vox clamantis*, in Latin verse; in seven books. Preferred also in the Bodleian library, and in that of All-Souls. It is a chronicle of the insurrection of the commons in the reign of Richard II. 3. *Confessio amantis*; printed at Westminster by Caxton, in 1493. Lond. 1532, 1554. It is a sort of poetical system of morality, interperfed with a variety of moral tales. 4. *De rege Henrico IV.* Printed in Chaucer's works. There are likewise several historical tracts, in manuscript, written by our author, which are to be found in different libraries; also some short poems printed in Chaucer's works.

GOWN, ROBE, a long upper garment, wore by lawyers, divines, and other graduates; who are hence called *men of the gown*, or *gownmen*.

The gown is an ample sort of garment, wore over the ordinary cloaths, hanging down to the feet.—It is fashioned differently for ecclesiastics, and for laymen.

At Rome, they gave the name "virile gown," 1232 *virilis*, to a plain kind of gown which their youth assumed when arrived at puberty. This they particularly denominated *prætexta*. See TOGA, PRÆTEXTA, &c.

"The remarkable drefs of our British ancestors, (Mr Whitaker observes), which continued very nearly the same to the commencement of the last century among the natives of Ireland, and has actually descended to the present among the mountaineers of Scotland, and is therefore rendered very familiar to our ideas, carried in it an astonishing appearance to the Romans. And it seems to have been equally the drefs of the men and women, among the nobles of Britain. But, in a few years after the erection of the Roman-British towns in the north, and in the progress of refinement among them, this ancient habit began to be disesteemed by the chiefs of the cities, and looked upon as the badge of ancient barbarism. And the growing prejudices were soon so greatly improved, that, within twenty years only after the construction of the towns, the British fagum was actually resigned, and the Roman *toga* or "gown" assumed by many of them.

"The gown, however, never became universal in Britain. And it seems to have been adopted only by the barons of the cities and the officers of the crown; and has therefore been transmitted to us as the robe of reverence, the ensign of literature, and the mantle of magistracy. The woollen and plaided garments of the chiefs having naturally superseded the leathern vestures of their clients, the former were still wore by the generality of the Britons. And they were retained by the gentlemen of the country, and by the commonalty both in country and city. That this was the case, appears evident from the correspondent conduct of the Gauls and Britons; who kept their *Virgata Sagula* to the last, and communicated them to the Franks and Saxons. The plaided drapery of the Britons still appeared general in the streets of Manchester; and must have formed a striking contrast to the gown of the chief, the dark mantle of Italy. And it, and the ornamented buttons on the shoulder, are preserved among us even to the present moment, in the parti-coloured clothing and the tasselled shoulder-knots of our footmen."

In some universities, physicians wear a scarlet-gown.—In the Sorbonne, the doctors are always in gowns and caps. Beadles, &c. wear gowns of two or more colours.

Among the French officers, &c. they distinguish those of the *short gown* or *robe*; which are such as have not been regularly examined.—They have also barbers of the *short gown*, who are such as are obliged to practise in an inferior way to those of the long robe.

GOWN is also taken in the general for civil magistrature, or the profession opposite to that of arms. In this sense it was that Cicero said, *cedant arma togæ*.

GRAAF (Regnier de), a celebrated physician, born at Schoonhaven, in Holland, in 1641. He studied

Gown,
Grass.

Grabe,
Grace.

died phytic at Prussia. He was educated in Leyden, where he acquired great honour by publishing a treatise *De Succo Pancreatico*. He also published three pieces upon the organs of generation, both male and female; upon which subject he had a controversy with Swammerdam. He died young, in 1673; and his works, with his life prefixed, were published at Leyden in 1677, in 8vo.

GRABE (John Ernest), a very learned writer in the beginning of the 18th century, a native of Koninberg in Prussia. He was educated in the Lutheran religion; but the reading of the fathers led him into doubts. He presented to the electoral consistory at Sambia in Prussia a memorial, containing his doubts. The elector gave orders to three eminent divines to answer them. Their answers shook him a little in his resolution of embracing the Roman Catholic religion; and one of them, Spener, advised him to go to England. He went; and king William gave him a pension, which was continued by Queen Anne. He was ordained a priest of the church of England, and honoured with the degree of Doctor of Divinity by the university of Oxford; upon which occasion Dr George Smalridge pronounced two Latin orations, which were afterwards printed. He wrote, 1. *Spicilegium S. S. Patrum, ut et Hæreticorum sæculi post Christum natum*, 8vo. 2. An edition of the Septuagint, from the Alexandrian manuscript in St James's library. 3. Notes on Justin, &c.; and other works, which are esteemed by the learned.

GRACE, among divines, is taken, 1. For the free love and favour of God, which is the spring and source of all the benefits we receive from him. 2. For the work of the Spirit renewing the soul after the image of God; and continually guiding and strengthening the believer to obey his will, to resist and mortify sin, and overcome it.

GRACE is also used, in a peculiar sense, for a short prayer said before and after meat.

The proofs of the moral obligation of this ceremony, drawn from different passages of the New Testament, are so well known, that it is needless to insist on them here. Some others, drawn from the practice of different nations, and of very remote antiquity, may not be disagreeable to our readers.

1. Athenæus tells us, in his *Deipnosoph.* lib. ii. that in the famous regulation made by Amphiclyon, king of Athens, with respect to the use of wine, both in sacrifices, and at home, he required that the name of *Jupiter the Sustainer* should be decently and reverently pronounced. The same writer, in lib. iv. p. 149. quotes Hermias, an author extant in his time, who informs us of a people in Egypt, inhabitants of the city of Naucratis, whose custom it was on certain occasions, after they had placed themselves in the usual posture of eating at the table, to rise again, and kneel; when the priest or precentor of the solemnity began to chant a grace, according to a stated form amongst them; and when that was over, they joined in the meal, in a solemn sacrificial manner. Heliodorus, has a passage in his *Ethiopes* to the same purpose, that it was the custom of the Egyptian philosophers to pour out libations and put up ejaculations before they sat down to meals. Porphyry, in his treatise *De abst.* lib. iv. p. 408. gives a great character of

Grace.

the Samæan gymnosophists in Egypt, for the strictness of their life: as one article in their favour, he observes, that at the founding of a bell before their meals, which consisted only of rice, bread, fruits, and herbs, they went to prayers; which being ended, and not before, the bell sounded again, and they sat down to eating. In general, this was a religious usage or rite amongst the ancient Greeks; and derived from yet older ages, if Clement of Alexandria rightly informs us. He mentions, that these people, when they met together to refresh themselves with the juice of the grape, sung a piece of music, in imitation of the Hebrews psalms, which they called a *scholion*. Livy, lib. xxxix. speaks of it as a settled custom among the old Romans, that they offered sacrifice and prayer to the gods, at their meals and computations. But one of the fullest testimonies to our purpose is given by Quintilian, *Declam.* 301. *Adisti mensam*, says he, *ad quam cum venire capimus, Deos invocamus*; "We approached the table (at supper together), and then invoked the gods."

The Jesuit Trigantius, in his very elegant and instructive narrative of the Christian expedition of their missionaries into China, book i. p. 69. gives this account of the people there, in the particular now under consideration. "Before they place themselves for partaking of an entertainment, the person who makes it, sets a vessel, either of gold or silver, or marble, or some such valuable material, in a charger full of wine, which he holds with both his hands, and then makes a low bow to the person of chief quality or character at the table. Then, from the hall or dining room, he goes into the porch or entry, where he again makes a very low bow, and turning his face to the south, pours out this wine upon the ground, as a thankful oblation to the Lord of heaven. After this, repeating his reverential obeisance, he returns into the hall, &c."

The Turks pray for a blessing on their meat; and many more instances might be produced of infidels, who have constantly observed the like custom, in some way or other.

2. The fact, therefore, with respect to the heathen world, being thus evident; we proceed to the sentiments and behaviour of the *Jews* in this particular. Their celebrated historian *Josèphus*, giving a detail of the rites and customs of the *Essenes*, who were confessedly the strictest and most pious professors of the Jewish religion, has this remarkable passage to the present purpose: "The priest," says he, "begs a blessing before they presume to take any nourishment; and it is looked upon as a great sin to take or taste before." Then follows the thanksgiving before meat: and "when the meal," proceeds he, "is over, the priest prays again; and the company with him blest and praise God as their preserver, and the donor of their life and nourishment."

Philo, in his book *De vita contemplativa*, gives an account of a body of men and women stricter than even the *Essenes* themselves. He distinguishes them by no particular name, though his relation is very accurate and circumstantial; namely, that, on certain special occasions, before "they took their meals, they placed themselves in a proper decent order; when, lifting up their hands and eyes to heaven, they prayed to

God,

God, that he would be pleased to be propitious to them in the use of those his good creatures."

From the Hebrew ritual it appears, that the Jews had their hymns and psalms of thanksgiving, not only after eating their passover, but on a variety of other occasions, at and after meals, and even between their several courses and dishes; as when the best of their wine was brought upon the table, or their aromatic confections, or the fruit of the garden, &c. On the day of the passover was sung Psalm cxiv. *When Israel came out of Egypt, &c.*

ARITHMEUS has a passage full on the present subject. "Moses," says he, "commands, that when the Jews are going to eat or drink, the company should immediately join in sacrifice or prayer." Where Rabbi Eleazar (upon that author) met with this sentence, has been controverted. But supposing it not to be found in scriptis, it is sufficient for us to know that the Jews did constantly practise this custom, upon the foundation of an ancient and general tradition and usage. That the prophet Daniel gave thanks after meat, is evident from the Apocryphal book concerning *Bel and the Dragon*, where, ver. 38, 39, we find, that *Daniel said, Thou hast remembered me, O God! neither hast thou forsaken them who seek thee and love thee. So Daniel arose, and did eat.* Of this text Prudentius takes notice in Cathemirin. hymn iv.

*Hu famulis Daniels excitavit
In celum suum, cique fortis,
Anon reddidit, alleluia dixit.*

The much-belov'd took the repast,
And up to heav'n his eyes he cast;
By which refresh'd, he sung aloud,
Amen, and alleluia to his God

Where, by the way, it may be observed, that the poet is a little mistaken, in making the prophet give thanks after meat; whereas, according to the text, he did it before.

GRACE, or *Gracefulness*, in the human character; an agreeable attribute, inseparable from motion as opposed to rest, and as comprehending speech, looks, gesture, and loco-motion.

As some motions are homely, the opposite to *graceful*; it is to be inquired, With what motions is this attribute connected? No man appears graceful in a mask; and therefore, laying aside the expressions of the countenance, the other motions may be genteel, may be elegant, but of themselves never are graceful. A motion adjusted in the most perfect manner to answer its end, is elegant; but still somewhat more is required to complete our idea of grace or gracefulness.

What this unknown *more* may be, is the nice point. One thing is clear from what is said, that this *more* must arise from the expressions of the countenance; and from what expressions so naturally as from those which indicate mental qualities, such as sweetness, benevolence, elevation, dignity? This promises to be a fair analysis; because of all objects mental qualities affect us the most; and the impression made by graceful appearance upon every spectator of taste, is too deep for any cause purely corporeal.

The next step is, to examine what are the mental qualities, that, in conjunction with elegance of motion, produce a graceful appearance. Sweetness, cheerfulness, affability, are not separately sufficient, nor

even in conjunction. Dignity alone, with elegant motion, produce a graceful appearance; but still more graceful with the aid of other qualities, those especially that are the most exalted. See DIGNITY.

But this is not all. The most exalted virtues may be the lot of a person whose countenance has little expression: such a person cannot be graceful. Therefore to produce this appearance, we must add another circumstance, viz. an expressive countenance, displaying to every spectator of taste, with life and energy, every thing that passes in the mind.

Collecting these circumstances together, grace may be defined, "that agreeable appearance which arises from elegance of motion and from a countenance expressive of dignity". Expressions of other mental qualities are not essential to that appearance, but they heighten it greatly.

Of all external objects, a graceful person is the most agreeable.

Dancing affords great opportunity for displaying grace, and haranguing still more. See DANCING, DECLAMATION, and ORATORY.

But in vain will a person attempt to be graceful, who is deficient in amiable qualities. A man, it is true, may form an idea of qualities he is destitute of; and, by means of that idea, may endeavour to express these qualities by looks and gestures: but such studied expression will be too faint and obscure to be graceful.

AGE OF GRACE, the appellation given to the act of parliament 1696, c. 32. which allows prisoners for civil debts to be set at liberty, upon making oath that they have not wherewithal to support themselves in prison, unless they are alimented by the creditors on whose diligences they were imprisoned, within ten days after intimation made for that purpose. See LAW, Part III. N° clxxxv. 13.

DAYS OF GRACE, three days immediately following the term of payment of a bill, within which the creditor must protest if payment is not obtained, in order to entitle him to recourse against the drawer. See LAW, Part III. N° clxxxiii. 16.

GRACE is also a title of dignity given to dukes, archbishops, and in Germany to barons and other inferior princes.

GRACES, in heathen mythology, three goddesses, whose names were *Aglaia*, *Thalia*, and *Euphrosyne*; that is, *shining*, *flourishing*, and *gay*; or, according to some authors, *Pasithea*, *Euphrosyne*, and *Egiale*. Some make them the daughters of Jupiter, and Eurynome, or Eunomia, the daughter of Oceanus; but the most common opinion is, that they were the daughters of Bacchus and Venus.

They are sometimes represented dressed; but more frequently naked, to shew, perhaps, that whatever is truly graceful, is so in itself, without the aid of exterior ornaments. They presided over mutual kindness and acknowledgment; bestowed liberality, eloquence, and wisdom, together with a good grace, gaiety of disposition, and easiness of manners.

GRACCHUS (Tiberius), elected tribune of the Roman people, demanded in the senate, in their name, the execution of the Agrarian law; by which all persons possessing above 200 acres of land were to be deprived of the surplus, for the benefit of the poor citizens, amongst whom an equal distribution of them

Gracula

Grafting.

was to be made; having carried his plan into execution by violent measures, he fell a victim to his zeal, being assassinated by his own party, 133 B. C. Caius, his brother, pursuing the same steps, was killed by the consul Opimius, 121 B. C. See (history of) Rome.

GRACULA, in ornithology, a genus belonging to the order of piceæ. The bill is convex, cultrated, and bare at the point; the tongue is not cloven, but is fleshy and sharpish; it has three toes before, and one behind. There are eight species, principally distinguished by their colour.

GRACULUS, in ornithology. See CORVUS.

GRADATION, in general, the ascending step by step, or in a regular and uniform manner.

GRADATION, in logic, a form of reasoning, otherwise called *SORITES*.

GRADATION, in painting, a gradual and insensible change of colour, by the diminution of the tints and shades.

GRADATION, in rhetoric, the same with CLIMAX.

GRADISKA, a strong town of Hungary in Sclavonia, on the frontiers of Croatia, taken by the Turks in 1691. It is seated on the river Save, in E. Lon. 17. 55. N. Lat. 45. 38.

GRADISKA, a strong town of Italy, in a small island of the same name on the frontiers of Friuli, in E. Lon. 13. 37. N. Lat. 46. 6. It is subject to the house of Austria.

GRADO, a strong town of Italy, in a small island of the same name, on the coast of Friuli, and in the territory of Venice. E. Lon. 13. 35. N. Lat. 45. 52.

GRADUATE, a person who has taken a degree in the university. See DEGREE.

GRÆVIUS (John George), one of the most learned writers in the 17th century. In the 24th year of his age, the elector of Brandenburg made him professor at Duisbourg. In 1658, he was invited to Deventer to succeed his former master Gronovius. In 1661, he was appointed professor of eloquence at Utrecht; and 12 years after, he had the professorship of politics and history conferred on him. He fixed his thoughts here, and refused several advantageous offers: He had, however, the satisfaction to be sought after by divers princes, and to see several of them come from Germany to study under him. He died in 1703, aged 71. His *Theſaurus antiquitatum et historiæ Italicæ*, &c. and other works, are well known.

GRAFTING, or ENGRAFTING, in gardening, is the taking a shoot from one tree, and inserting it into another in such a manner, that both may unite closely and become one tree. By the ancient writers on husbandry and gardening, this operation is called *in-cision*, to distinguish it from inoculation or budding, which they call *inferere oculis*.

Grafting hath been practised from the most remote antiquity; but its origin and invention is differently related by naturalists. Theophrastus tells us, that a bird having swallowed a fruit whole, cast it forth into a cleft or cavity of a rotten tree; where mixing with some of the putrified parts of the wood, and being washed with the rains, it budded, and produced within this tree another tree of a different kind. This led the husbandman to certain reflections, from which soon afterwards arose the art of engrafting.

Grafting.

Pliny sets the same thing in a different light: a countryman having a mind to make a pallisade in his grounds, that it might endure the longer, he bethought himself to fill up and strengthen the bottom of the pallisade, by running or waiting it with the trunks of ivy. The effect of this was, that the stakes of the pallisades taking root, became engrafted into the trunks, and produced large trees; which suggested to the husbandman the art of engrafting.

The use of grafting is to propagate any curious sorts of fruits so as to be certain of the kinds; which cannot be done by any other method: for as all the good fruits have been accidentally obtained from seeds, so the seeds of these, when sown, will many of them degenerate, and produce such fruit as is not worth the cultivating: but when shoots are taken from such trees as produce good fruit, these will never alter from their kind, whatever be their stock or tree on which they are grafted.

The reason or philosophy of engrafting is somewhat obscure; and had not accident given the first hint, all our knowledge of nature would never have led us to it. The effect is ordinarily attributed to the diversity of the pores or ducts of the graft from those of the stock, which change the figure of the particles of the juices in passing through them to the rest of the tree.

Mr Bradley, on occasion of some observations of Agricola, suggests something new on this head. The stock grafted on, he thinks, is only to be considered as a fund of vegetable matter, which is to be filtered through the cyon, and digested, and brought to maturity, as the time of growth in the vessels of the cyon directs. A cyon, therefore, of one kind, grafted on a tree of another, may be rather said to take root in the tree it is grafted in, than to unite itself with it: for it is visible that the cyon preserves its natural purity and intent, though it be fed and nourished with a mere crab; which is, without doubt, occasioned by the difference of the vessels in the cyon from those of the stock: so that grafting may be justly compared to planting.

In prosecution of this view of that ingenious author, we add, that the natural juices of the earth, by their secretion and comminution in passing through the roots, &c. before they arrive at the cyon, must doubtless arrive there half elaborated and concocted; and so disposed for a more easy, plentiful, and perfect assimilation and nutrition; whence the cyon must necessarily grow and thrive better and faster than if it were put immediately in the ground, there to live on coarse diet and harder of digestion: and the fruit produced by this further preparation in the cyon, must be finer and further exalted than if fed immediately from the more imperfectly prepared and altered juices of the stock.

Many have talked of changing of species, or producing mixed fruits, by engrafting one tree on another of the same class; but as the graft carries the juices from the stock to the pulp of the fruit, there is little hope of succeeding in such an expectation by ever so many repeated grafts: but if, after changing the graft and stock several successive times, you set the seed of the fruit produced on the graft in a good mould, it is possible that a change may happen, and

a new mixed plant may be produced. Thus the almond and peach may, by many changes in the graftings, and by interrations of the stones of the peaches, and of the shells of the almonds, and by teribrations of the stem of the root here and there, alter their nature so much, that the coat or pulp of the almond may approach to the nature of the peach, and the peach may have its kernel enlarged into a kind of almond; and on the same principle, the curious gardener may produce many such mixed kinds of things.

Mr Du Hamel has observed, that, in grafting of trees, there is always found at the insertion of the graft, a change in the directions of fibres, and a sort of twisting or turning about of the vessels, which greatly imitates that in the formation of certain glands in animal bodies: and from thence he infers, that a new sort of vicus being formed by this means, the fruit may very naturally be so far influenced by it, as to be meliorated on the new branch; but that no such sudden and essential changes can be effected by those means, as too many of the writers on agriculture pretend. He observes, however, that this anatomical observation would not have been sufficient to convince him of the falsity of too many of these relations, had not experiment joined to confirm him in this opinion. He tried many grafts on different trees; and, for fear of error, repeated every experiment of consequence several times: but all served only to convince him of the truth of what he at first suspected. He grafted in the common way the peach upon the almond, the plum upon the apricot, the pear upon the apple, the quince, and the white thorn; one species of plum on other very different species, and upon the peach the apricot and the almond. All these succeeded alike: the species of the fruit was never altered; and in those which would not come to fruit, the leaves, the wood, and the flowers, were all the same with those of the tree from whence the graft was taken.

Authors on agriculture have also mentioned a very different sort of grafting; namely, the setting grafts of one tree upon stocks of a different genus; such as the grafting the pear upon the oak, the elm, the maple, or the plum, &c. Mr Du Hamel tried a great number of those experiments carefully, and found every one of them unsuccessful; and the natural conclusion from this was, that there must be some natural alliance between the stocks and their grafts, otherwise the latter will either never grow at all, or very soon perish.

Notwithstanding the facility with which grafts generally take on good stocks, there are many accidents and uncertainties attending them in their different periods. Some perish immediately; some, after appearing healthy for many months, and some even for years. Of these last some die without the stocks suffering any thing; others perish together with the stocks. It is very certain, that the greater part of grafted trees do not live so long as they would have done in their natural state; yet this is no unexceptionable rule: for there are some which evidently live the longer for this practice; nay, there are instances of grafts which, being placed on stocks naturally of short duration, live longer than when placed on those which are more robust and lasting. These irregularities have been but little considered hitherto, though they might

be made productive of considerable advantages.—One great requisite for the succeeding of any graft is, that it be in its own nature capable of so close and intimate an union with the substance of the stock, that it becomes as it were a natural branch of it. If all trees resembled one another in their structure and juices, the size and elasticity of their vessels, &c. probably the grafts of all trees would succeed upon another; but this is by no means the case.

Trees are well known to be composed of numerous arrangements of hollow fibres, and these are different and unequal in every species of tree. In order to the succeeding of a graft, it is plain that there must be a conformity in its vessels and juices with those of the stock; and the more nearly they agree in this, probably the better they succeed, and the farther they differ, the worse.—If there be, however, some difference in the solid parts of trees, there are evidently many more in the juices. The sap in some trees is white as milk, in others it is reddish, and in some as clear and limpid as water. In some, it is thin and very fluid; in others, thick and viscous. In the taste and smell of these juices there are also not less differences: some are sweet, some insipid, some bitter, some acid, and some fetid: the quality of the sap thus makes a very great difference in the nature of trees; but its quantity, and derivation to the parts, is scarce less observable. Of this we have familiar instances in the willow and the box; one of which will produce longer shoots in a year, than the other in 20.

Another difference yet more striking, and indeed more essential in regard to the growth of grafts than all these, is the different season of the year at which trees shoot out their leaves, or ripen their flowers. The almond-tree is in flower before other trees in general have opened their earliest buds; and when other trees are in flower, this is full of leaves, and has its fruit set before the mulberry begins to push out its earliest buttons. When we consider all these differences in trees, we cannot but wonder how it is possible for a branch of one to live upon another; and it becomes a much more perplexing question how any graft can succeed, than how such numbers come to miscarry. A graft of one pear upon another shall be seen to succeed presently as if upon its own tree; and in a fortnight will gain six inches in length, and so of some others.—This must be owing to the great similarity between the stock and the graft in all respects; and a great contrariety or difference in structure of parts will make as remarkable a difference on the other hand. An instance of this may be observed in the plum and the elm; which no art can ever make to succeed upon one another, whether the plum be grafted on the elm, or the elm upon the plum stock. These are examples of the extremes of easy growth, and of absolute decay; but there are many conjunctions of trees which seem of a middle nature between the two, and neither immediately perish, nor totally succeed. Of these, such as were grafted in autumn usually remain green the whole winter without pushing; and those which are grafted in spring remain green a month or longer, but still without shooting. Some particular ones have also been known to make a few shoots the first, or even the second sap season after the operation; but all perish at the end of these times.

times. Of this kind are the grafts of the pear-tree upon the elm, the maple, and the hornbeam, and the mulberry upon the elm and fig, with many others.

When we come to inquire into the cause of this, we find that these grafts, though unnatural, have yet had a communication with the stock by means of a few small vessels, which has been sufficient to keep them green, or even to make them shoot a little, during the great ascent of the sap: But the far greater number of the fibres have had all the while no communication, and are found putrified, dried up, or covered with a putrid juice. This has evidently happened by means of the disproportion in size between the vessels of the stock and of the graft, and the great difference between their natural juices, which are obstacles abundantly sufficient to prevent either an union of the fibres, or the introduction of new sap.

The grafts of the almond on the plum, and of the plum on the almond, always grow very vigorously for the first year, and give all the appearances imaginable of succeeding entirely; yet they always perish in the second or third year. The almond-graft upon the plum-stock always pushes out very vigorously at first; but the part of the stock immediately under the graft grows smaller and perishes, the graft absorbing too much of the juices, and the graft necessarily perishes with it. The decay of the whole generally happens early in the spring; and that plainly from the different season of the natural shooting of the two trees, the almond pushing very vigorously, and consequently draining the stock of its juices, at a time when, according to its nature, the juices are but in small quantity in it, and the sap does not begin to ascend. The grafts of the plum on the almond are, from the same cause, furnished with an abundance of sap which they have at that time no occasion for; and consequently they as certainly perish of repletion, as the other of inanition.

The peach grafted on the plum succeeds excellently, and lives longer than it would have done in a natural state; the reason seems to be, that the peach is a tender tree, shoots with great vivacity, and produces more branches than the root is able to maintain. Thus the peach trees are usually full of dead wood; and often their large branches perish, and sometimes their whole trunk. On this occasion the plum being a slow shooting tree, communicates its virtue to the graft; and the peach consequently sends out shoots which are more robust and strong, and are no more in number than the root is able to supply with nourishment, and consequently the tree is the more lasting.

The grafts, or cions, with which the grafting is effected, are young shoots of last summer's growth, for they must not be more than one year, and such as grow on the outside branches, and robust but moderate shooters; such also as are firm and well ripened, should always be chosen from healthful trees: observing, that the middle part of each shoot is always the best graft, cut at the time of grafting to five or six inches in length, or so as to have four or five good eyes or buds; but should be preserved at full length till grafting time, and then prepared as hereafter directed.

They should be collected or cut from the trees in February, in mild weather, before their buds begin to swell, or advance much for shooting: in collecting them, choose such as have not made lateral or side shoots; cut

them off at full length; and if they are not to be used as soon as they are collected, lay their lower ends in some dry earth in a warm border till grafting time, and, if severe weather should happen, cover them with dry litter.

The proper tools and other materials used in grafting, are,

A strong knife for cutting off the heads of the stocks, previous to the insertion of the graft; also a small hand-saw for occasional use in cutting off the heads of large stocks.

A common grafting-knife, or strong, sharp pen-knife, for cutting and shaping the grafts ready for insertion; also to slope and form the stocks for the reception of the grafts.

A flat grafting-chisel and small mallet for clefting large stocks, in cleft-grafting, for the reception of the graft.

A quantity of new bals-strings for bandages, for tying the grafted parts close, to secure the grafts, and promote their speedy union with the stock. And,

A quantity of grafting clay, for claying closely round the grafts after their insertion and binding, to defend the parts from being dried by the sun and winds, or too much liquified by wet, or pinched by cold; for these parts ought to be closely surrounded with a coat of clay in such a manner as effectually to guard them from all weathers, which would prove injurious to young grafts, and destroy their cementing property, so as to prevent the junction: therefore, a kind of stiff loamy mortar must be prepared of strong fat loam, or, in default thereof, any sort of tough binding clay, either of which should be laid in an heap, adding thereto about a fourth of fresh horse-dung free from litter, and a portion of cut hay, mixing the whole well together, and adding a little water: then let the whole be well beaten with a stick upon a floor, or other hard substance; and as it becomes too dry, apply more water, at every beating turning it over, always continuing to beat it well at top till it becomes flat; which must be repeated more or less according to the nature of the clay, but should be several times done the first day: next morning repeat the beating, still moistening it with water; and by thus repeating the beating six or eight times every day for two or three days, or every other day at least, for a week, it will be in proper order for use; observing, it should be prepared a week at least before it is used, but if a month the better.

The season for performing the operation of grafting is February and March: though, when the work is performed in February, it for the general part proves the most successful, more especially for cherries, plums, and pears; and March grafting is well adapted for apples.

There are different methods of grafting in practice, termed Whip-grafting---Cleft-grafting---Crown-grafting---Cheek-grafting---Side-grafting---Root-grafting---and Grafting by approach or Inarching: but Whip-grafting and Cleft-grafting are most commonly used; and Whip-grafting most of all, as being the most expeditious and successful of any.

Whip-grafting.—This being the most successful method of grafting is the most commonly practised in all the nurseries; it is always performed upon small stocks, from

from about the size of a goose-quill, to half an inch or a little more or less in diameter, but the nearer the stock and graft approach in size the better; and is called *whip-grafting*, because the grafts and stocks being nearly of a size, are sloped on one side, so as to fit each other, and tyed together in the manner of whips, or joints of angling-rods, &c. and the method is as follows.

Mawe's
Diss. of
Gardening.

Having the cions or grafts, knife, bandages, and clay ready, then begin the work by cutting off the head of the stock at some clear smooth part thereof; this done, cut one side sloping upwards, about an inch and half or near two inches in length, and make a notch or small slit near the upper part of the slope downward about half an inch long, to receive the tongue of the cion; then prepare the cion, cutting it to five or six inches in length, forming the lower end also in a sloping manner, so as exactly to fit the sloped part of the stock, as if cut from the same place, that the rinds of both may join evenly in every part; and make a slit so as to form a sort of tongue to fit the slit made in the slope of the stock; then place the graft, inserting the tongue of it into the slit of the stock, applying the parts as evenly and close as possible; and immediately tie the parts close together with a string of bafs, bringing it in a neat manner several times round the stock and graft; then clay the whole over near an inch thick on every side, from about half an inch or more below the bottom of the graft, to an inch over the top of the stock, finishing the whole coat of clay in a kind of oval globular form, rather longwise, up and down, closing it effectually about the cion, and every part, so as no sun, wind, nor wet may penetrate, to prevent which is the whole intention of claying; observing to examine it now and then, to see if it any where cracks or falls off, and if it does it must be instantly repaired with fresh clay.

This sort of grafting may also be performed, if necessary, upon the young shoots of any bearing tree, if intended to alter the sorts of fruits, or have more than one sort on the same tree.

By the middle or latter end of May, the grafts will be well united with the stock, as will be evident by the shooting of the graft; then the clay should be wholly taken away; but suffer the bafs bandage to remain some time longer until the united parts seem to swell and be too much confined by the ligature, then take the tying wholly off.

Their farther culture is directed under the respective articles, whether designed for dwarfs or standards, &c.

Cleft-grafting.—This is so called, because the stock being too large for whip-grafting is cleft or slit down the middle for the reception of the graft; and is performed upon stocks from about one to two inches diameter.

First, with a strong knife cut off the head of the stock; or if the stock is very large, it may be headed with a saw; and cut one side sloping upwards about an inch and half to the top; then proceed with a strong knife or chisel, to cleave the stock at top, cross-way the slope, fixing the knife or chisel towards the back of the slope, and with your mallet strike it, so as to cleave the stock about two inches, or long enough to admit the graft, keeping it open with the chisel; this done, prepare

the cion, cutting it to such length as to leave four or five eyes, the lower part of which being sloped on each side, wedge-fashion, an inch and half or two inches long, making one side to a thin edge, the other much thicker, leaving the rind thereon, which side must be placed outward in the stock; the cion being thus formed, and the cleft in the stock being made and kept open with the chisel, place the graft therein at the back of the stock the thickest side outward, placing the whole cut part down into the cleft of the stock, making the rind of the stock and graft join exactly; then removing the grafting chisel, each side of the cleft will closely squeeze the graft, so as to hold it fast; it is then to be bound with a ligature of bafs, and clayed over, as observed in whip-grafting, leaving three or four eyes of the cions uncovered.

If intended to graft any pretty large stocks or branches by this method, two or more grafts may be inserted in each; in this case the head must be cut off horizontally, making no slope on the side, but smooth the top, then cleave it quite a-crofs, and place a graft on each side, as the stock may be cleft in two places, and insert two grafts in each cleft; they are thus to be tied and clayed as in the other methods.

This method of grafting may be performed upon the branches of bearing trees, when intended either to renew the wood, or change the sort of fruit.

Towards the latter end of May, or the beginning of June, the junction of the graft and stock in either method will be effectually formed, and the graft begin to shoot, when the clay may be taken off, and in a fortnight or three weeks after take off also the bandages.

Crown-grafting.—This kind of grafting is commonly practised upon such stocks as are too large to cleave, and is often performed upon the large branches of apple and pear trees, &c. that already bear fruit, when it is intended to change the sorts, or renew the tree with fresh-bearing wood. It is termed *crown-grafting*, because the stock or branch being headed down, several grafts are inserted at top all around betwixt the wood and bark, so as to give it a crown-like appearance; observing, that this kind of grafting should not be performed until March, or early in April; for then the sap being in motion, renders the bark and wood of the stock much easier to be separated for the admission of the graft.

The manner of performing this sort of grafting is as follows:

First, cut off the head of the stock or branch with a saw horizontally, and pare the top smooth; then having the grafts, cut one side of each flat, and somewhat sloping, an inch and half long, forming a sort of shoulder at top of the slope to rest upon the crown of the stock; and then raising the rind of the stock with a wedge, so as to admit the cion between that and the wood two inches down, place the grafts with the flat side next the wood, thrusting it down far enough for the shoulder to rest upon the top of the stock, and in this manner may be put three, four, five, or more grafts in one large stock or branch.

When the grafts are all thus inserted, let the whole be tied tight and well clayed; observing to leave two or three eyes of each graft uncovered, by raising the clay an inch above the top of the stock, so as to throw the wet quickly off, without lodging about the grafted

Grafting. parts, which would ruin the whole work.

Crown-grafting may also be performed, by making several clefts in the crown of the stock, and inserting the grafts round the top into the clefts.

The grafts will be pretty well united with the stock, and exhibit a state of growth, by the end of May or beginning of June, and the clay may then be taken away.

Mason's
Diss.

The trees grafted by this method will succeed extremely well; but, for the first two or three years, have this inconvenience attending them, of being liable to be blown out of the stock by violent winds; which must be remedied by tying long sticks to the body of the stock or branch, and each graft tied up to one of the sticks.

Cheek-grafting.—Cut the head of the stock off horizontally, and pare the top smooth; then cut one side sloping an inch and half or two inches deep, and cut the lower part of the graft sloping the same length, making a fort of shoulder at top of the sloped part: it is then to be placed upon the sloped part of the stock, resting the shoulder upon the crown of it: bind it with bafs, and finish with a covering of clay as in the other methods.

Side-grafting.—This is done by inserting grafts into the sides of the branches without heading them down; and may be practised upon trees to fill up any vacancy, or for the purpose of variety, to have several sorts of apples, pears, plums, &c. upon the same tree.

It is performed thus. Fix upon such parts of the branches where wood is wanted to furnish the head or any part of the tree; there slope off the bark and a little of the wood, and cut the lower end of the grafts to fit the part as near as possible; then join them to the branch, and tie them with bafs, and clay them over.

Root-grafting.—This is done by Whip-grafting cions upon pieces of the root of any tree of the same genus, and planting the root where it is to remain; it will take root, draw nourishment, and feed the graft.

Grafting by Approach, or Inarching.—This sort of grafting is, when the stocks designed to be grafted, and the tree from which you intend to take the graft, either grow so near, or can be placed so near together, that the branch or graft may be made to approach the stock, without separating it from the tree, till after its union or junction with the stock; so that the branch or graft being bent to the stock, they together form a sort of arch; whence it is called Grafting by Approach, or Inarching. Being a sure method, it is commonly practised upon such trees as are with difficulty made to succeed by any of the former ways of grafting.

When intended to propagate any kind of tree or shrub by this method of grafting, if the tree, &c. is of the hardy kind, and growing in the full ground, a proper quantity of young plants for stocks must be set round it; and when grown of a proper height, the work of inarching must be performed; or, if the branches of the tree you design to graft from is too high for the stocks, in that case stocks must be planted in pots, and a slight stage must be erected around the tree, of due height to reach the branches, and the

pots containing the stocks must be placed upon the stage.

Grafting.

As to the method of performing the work: Observe, that in this method of grafting, it is sometimes performed with the head of the stock cut off, and sometimes with the head left on till the graft is united with the stock; though, by previously heading the stock, the work is much easier performed; and having no top, its whole effort will be directed to the nourishment of the graft; having, however, the stocks properly placed, either planted in the ground, or in pots around the tree to be propagated; then make the most convenient branches approach the stock, and mark on the body of the branches the parts where they will most easily join to the stock, and in those parts of each branch pare away the bark and part of the wood two or three inches in length, and in the same manner pare the stock in the proper place for the junction of the graft; then make a slit upwards in the branch, so as to form a sort of tongue, and make a slit downwards in the stock to admit it; let the parts be then joined, slipping the tongue of the graft into the slit of the stock, making the whole join in an exact manner, and tie them closely together with bafs, and afterwards cover the whole with a due quantity of clay, as before directed in the other methods.

After this, let a stout stake be fixed, if possible, for the support of each graft, to which let that part of the stock and graft be fastened, which is necessary to prevent their being disjoined by the wind.

The operation being performed in spring, let them remain in that position about four months, when they will be united, and the graft may then be separated from the mother-tree. In doing this, be careful to perform it with a steady hand, so as not to loosen or break out the graft, sloping it off downwards close to the stock; and if the head of the stock was not cut down at the time of grafting, it must now be done close to the graft, and all the old clay and bandage must also be cleared away, and replaced with new, to remain a few weeks longer.

Observe, however, that if you shall think the grafts are not firmly united with the stock in the period of time above-mentioned, let them remain another year till autumn, before you separate the grafts from the parent-tree.

By this kind of grafting, you may raise almost any kind of tree or shrub, which is often done by way of curiosity, to ingraft a fruit-bearing branch of a fruit-tree upon any common stock of the same fraternity or genus, whereby a new tree bearing fruit is raised in a few months. This is sometimes practised upon orange and lemon trees, &c. by grafting bearing-branches upon stocks raised from the kernels of any of the same kind of fruit, or into branches of each other, so as to have orange, lemons, and citrons, all on the same tree.

An anonymous author has given us in a treatise, published at Hamburg, under the title *Amenitates Hortensæ Novæ*, a new method of grafting trees, so as to have very beautiful pyramids of fruit upon them, which will exceed in beauty, flavour, and quantity, all that can be otherwise produced. This, he says, he had long experienced, and gives the following method

Graham.

thod of doing it. The trees are to be transplanted in autumn, and all their branches cut off. Early in the following summer the young shoots are to be pulled off, and the buds are then to be ingrafted into them in an inverted direction. This, he says, adds not only to the beauty of the pyramids, but also makes the branches more fruitful. There are to be closely connected to the trunk, and to be fastened in with the common ligature: they are to be placed circularly round the tree, three buds in each circle, and these circles at six inches distance from one another. The old trees may be grafted in this manner, the success having been found very good in those of twenty years standing; but the most eligible trees are those which are young, vigorous, and full of juice, and are not above a finger or two thick. When these young trees are transplanted, they must be fenced round with pales to defend them from the violence of the wind; and there must be no dung put to them till they are thoroughly rooted, for fear of rotting them before the fibres strike. The buds ingrafted must be small, that the wounds made in the bark to receive them, not being very large, may heal the sooner; and if the buds do not succeed, which will be perceived in a fortnight, there must be others put in their place. The wound made to receive these buds must be a straight cut, parallel to the horizon; and the piece of bark taken out must be downward, that the rain may not get in at the wound. In the autumn of the same year, this will be a green and flourishing pyramid; and the next summer it will flower, and ripen its fruit in autumn.

GRAHAM (James), Marquis of Montrose, was comparable to the greatest heroes of antiquity. He undertook, against almost every obstacle that could terrify a less enterprising genius, to reduce the kingdom of Scotland to the obedience of the king; and his success was answerable to the greatness of the undertaking. By valour, he in a few months almost effectuated his design; but, for want of supplies, was forced to abandon his conquests. After the death of Charles I. he, with a few men, made a second attempt, but was immediately defeated by a numerous army. As he was leaving the kingdom in disguise, he was betrayed into the hands of his enemy, by the Lord Aston, his intimate friend. He was carried to his execution with every circumstance of indignity that wanton cruelty could invent; and hanged upon a gibbet 30 feet high, with the book of his exploits appended to his neck. He bore this reverse of fortune with his usual greatness of mind, and expressed a just scorn at the rage and insult of his enemies. We meet with many instances of valour in this active reign; but Montrose is the only instance of heroism. He was executed May 21st, 1650. See BRITAIN, n° 137, 143, 165.

GRAHAM (Sir Richard), lord viscount Preston, eldest son of Sir George Graham of Netherby, in Cumberland, Bart. was born in 1648. He was sent ambassador by Charles II. to Lewis XIV. and was master of the wardrobe and secretary of state under James II. But when the Revolution took place, he was tried and condemned, on an accusation of attempting the restoration of that prince; though he obtained a pardon by the queen's intercession. He spent the remainder of his days in retirement, and published an ele-

gant translation of *Boethius on the consolation of philosophy*. He died in 1695.

GRAHAM (George), clock and watch maker, the most ingenious and accurate artist in his time, was born in 1675. After his apprenticeship, Mr Tompion received him into his family, purely on account of his merit; and treated him with a kind of parental affection as long as he lived. Beside his universally acknowledged skill in his profession, he was a complete mechanic and astronomer; the great mural arch in the observatory at Greenwich, was made for Dr Halley, under his immediate inspection, and divided by his own hand: and from this incomparable original, the best foreign instruments of the kind are copies made by English artists. The sector by which Dr Bradley first discovered two new motions in the fixed stars, was of his invention and fabric: and when the French academicians were sent to the north to ascertain the figure of the earth, Mr Graham was thought the fittest person in Europe to supply them with instruments; those who went to the south were not so well furnished. He was for many years a member of the Royal Society, to which he communicated several ingenious and important discoveries; and regarded the advancement of science more than the accumulation of wealth. He died in 1751.

GRAHAM'S DYKE. See ANTONINUS'S WALL.

GRAIN, corn of all sorts, as barley, oats, rye, &c. See CORN, WHEAT, &c.

GRAIN is also the name of a small weight, the twentieth part of a scruple in apothecaries weight, and the twenty-fourth of a penny-weight Troy.

A grain-weight of gold-bullion is worth two-pence, and that of silver but half a farthing.

GRAIN also denotes the component particles of stones and metals, the veins of wood, &c. Hence cross-grained, or against the grain, means contrary to the fibres of wood, &c.

GRAIN (Baptist le), master of the requests in ordinary to Mary de Medicis queen of France's household, wrote *The history of Henry the Great*, and of *Louis XIII.* from the beginning of his reign to the death of the marshal d'Ancre in 1617. This history is reckoned to be wrote with impartiality, and the spirit of a true patriot; and contains many things not to be found any where else. He vigorously asserts the edict that had been granted to the reformed.

GRAMINÆ, GRASSES; one of the seven tribes or natural families, into which all vegetables are distributed by Linnaeus in his *Philosophia Botanica*. They are defined to be plants which have very simple leaves, a jointed stem, a husky calix termed *gluma*, and a single seed. This description includes the several sorts of corn as well as grasses. In Tournefort they constitute a part of the fifteenth class, termed *apetalæ*; and in Linnaeus's sexual method, they are mostly contained in the second order of the third class, called *triandria digynia*.

This numerous and natural family of the grasses, has engaged the attention and researches of several eminent botanists. The principal of these are, Ray, Monti, Micheli, and Linnaeus.

M. Monti, in his *Catalogus stirpium agri Bononiensis*, *gramina ac hujusmodi affinia completens*, printed at Bononia in 1719, divides the grasses, from the dis-

Grain
Gramina.

position of their flowers, as Theophrastus and Ray had divided them before him, into three sections or orders—These are, 1. Grasses having flowers collected in a spike. 2. Grasses having their flowers collected in a panicle or loose spike. 3. Plants that in their habit and external appearance are allied to the grasses.

This class would have been natural if the author had not improperly introduced sweet-rush, juncus, and arrow-headed grass, into the third section. Monti enumerates about 306 species of the grasses, which he reduces under Tournefort's genera; to these he has added three new genera.

Scheuchzer, in his *Aristographia*, published likewise in 1719, divides the grasses, as Monti, from the disposition of their flowers into the five following sections. 1. Grasses with flowers in a spike, as phalaris, anthoxanthum, and frumentum. 2. Irregular grasses, as schoenanthus and cornucopiae. 3. Grasses with flowers growing in a simple panicle or loose spike, as reed and millet. 4. Grasses with flowers growing in a compound panicle, or diffused spike, as oats and poa. 5. Plants by their habit nearly allied to the grasses, as cypress-grass, scirpus, linagrostis, rush, and Scheuchzeria.

Scheuchzer has enumerated about four hundred species, which he describes with amazing exactness.

Micheli has divided the grasses into six sections, which contain in all, forty-four genera, and are arranged from the situation and number of the flowers.

GRAMINA, the name of the fourth order in Linnaeus's fragments of a natural method, consisting of the numerous and natural family of the grasses, viz. agrostis; aira; alopecurus, or fox-tail grass; anthoxanthum, or vernal grass; aristida; arundo, or reed; avena, or oats; bobartia; briza; bromus; cinna; cornucopiae, or horn-of-plenty grass; cynosurus; dactylis; elymus; festuca, or fescue-grass; hordeum, or barley; lagurus, or hare's-tail grass; lolium, or darnel; lygeum, or hooded matweed; melica; mileum, or millet; nardus; oryza, or rice; panicum, or panic-grass; paspalum; phalaris, or canary-grass; phleum; poa; saccharum, or sugar-cane; secale, or rye; stipa, or winged spike-grass; triticum, or wheat; uniola, or sea-side oats of Carolina; coix, or Job's tears; olyra; pharus; tripsacum; zea, Indian Turkey wheat, or Indian corn; zizania; ægilops, or wild fescue-grass; andropogon; apluda; cenchrus; holcus, or Indian millet; ischæmum. See BOTANY, p. 1305, col. 2.

GRAMMAR.

1. **GRAMMAR** is the art of speaking or of writing any language with propriety.

2. Grammar considered as an *Art*, necessarily supposes the previous existence of language; and as its design is to teach any language to those who are ignorant of it, it must be adapted to the genius of that particular language of which it treats.—A just method of grammar, therefore, supposing a language introduced by custom, without attempting any alterations in it, furnishes certain observations called *rules*, to which the methods of speaking used in this language may be reduced; this collection of rules is what is called a *grammar* of any particular language. For the greater distinctness with regard to these rules, grammarians have usually divided this subject into four distinct heads, viz. *ORTHOGRAPHY, or the art of combining letters into syllables, and syllables into words; ETYMOLOGY, or the art of deducing one word from*

another, and the various modifications by which the sense of any one word can be diversified; SYNTAX, or what relates to the construction or due disposition of the words of a language into sentences or phrases; and PROSODY, or that which treats of the quantities and accents of syllables, and the art of making verses.

3. But grammar considered as a *Science*, views language in itself: neglecting particular modifications, or the analogy which words may bear to each other, it examines the analogy and relation between words and things; distinguishes between those particulars which are *essential* to language, and those which are only *accidental*; and thus furnishes a certain standard by which different languages may be compared, and their several excellencies or defects pointed out. This is what is called *PHILOSOPHIC or UNIVERSAL GRAMMAR*.

OF UNIVERSAL GRAMMAR.

4. **IT** is not necessary here to inquire how language was originally invented, to trace the various changes it may have undergone, or to examine whether any one language may be considered as the original from which all others have been derived: it is sufficient for our purpose to observe, that all mankind, however diversified in other respects, agree in the common use of language; from which it appears, that language is not merely accidental and arbitrary, but founded in the nature of things, and within the reach of all mankind. It is therefore an object worthy of a philosophic inquiry, to discover the foundations upon which this universal fabric has been raised.

5. The design of speech is to publish to others the thoughts and perceptions of our mind. The most acute feelings of man, as well as of every other ani-

mal, are expressed by simple inarticulate sounds, which, as they tend to the preservation of the individual, are universally understood. These inarticulate but significant sounds, therefore, constitute a natural and universal language, which man, as a mere sensitive being, partakes in common with the other animals. But as man is not only endowed with sensation, but with the faculty of reasoning, simple inarticulate sounds are insufficient for expressing all the various modifications of thought, or for communicating to others a chain of argumentation: it was therefore necessary to call in the aid of *articulation*; which by modifying these simple sounds, and by fixing a particular meaning to these modifications, forms the language peculiar to man, and which distinguishes him from all other animals, and enables him to communicate with facility all

all that diversity of ideas with which his mind is stored. These sounds, thus modified and having a determinate meaning, are called **WORDS**; and as all language is composed of significant words variously combined, a knowledge of them is necessary previous to our acquiring an adequate idea of language.

6. But, as it is by words that we express the various ideas which occur to the mind, it is necessary to examine how ideas themselves are suggested, before we can ascertain the various classes into which words may be distributed. With this view, therefore, let us suppose a reasonable being, devoid of every prepossession whatever, placed upon this globe. His attention would, in the first place, be directed to the various objects which he saw existing around him: these he would naturally endeavour to distinguish from one another, and give them names, by means of which the idea of them might be recalled when the objects themselves were absent. This is one copious source of words; and forms a natural class which must be common to every language, and which is distinguished by the name of **NOUNS**. And as these nouns are the names of the several substances which exist, they have likewise been called **SUBSTANTIVES**.

7. It would likewise be early discovered, that every one of these substances was endowed with certain qualities or attributes, to express which another class of words would be requisite. Thus, *to be weighty*, is a quality of matter; *to think*, is an attribute of man. Therefore, in every language, words have been invented to express the various qualities of the several objects which exist. These may all be comprehended under the general denomination of **ATTRIBUTIVES**.

8. These two classes of words must comprehend all things that exist: for whatever exists, must of necessity be either a substance, or the attribute of some substance; and hence these two classes must comprehend all those words which are significant of themselves, and may be called **WORDS SIGNIFICANT OF THEMSELVES**. If any other words occur, they can only be significant in so far as they tend to explain or connect the words of the two former classes.

9. But, although these words form the basis or matter of a language, in the same manner as stones form the matter of a building; yet, as stones cannot be arranged into a regular structure without a cement to bind and connect them, so these original words stand in need of others to connect them, before they can be made to express all the variety of our ideas. Another order of words, therefore, was necessary, which, although not of themselves significant, yet, when joined with others, might acquire a meaning. These form a second general class of words, that may be called **WORDS NOT OF THEMSELVES SIGNIFICANT**, and which cannot acquire any meaning but so far as they serve either to **EXPLAIN** or **CONNECT** the others.

10. Hence, therefore, all words which can possibly be invented, may be divided into two general classes; those that are **SIGNIFICANT OF THEMSELVES**, and those that are **NOT**. Words which are significant of themselves, are either expressive of the names of substances, and therefore called **SUBSTANTIVES**; or, of qualities, which we call **ATTRIBUTIVES**. Words which are not significant of themselves, must acquire a meaning either as defining or connecting others, which we shall

arrange under the two classes of **DEFINITIVES** and **CONNECTIVES**, each of which shall be examined in their order.

CHAPTER I. OF SUBSTANTIVES.

11. **SUBSTANTIVES** may be divided into two classes, viz. those which are primary, commonly called **NOUNS**; and those of a secondary order, which are often substituted for nouns, and are hence called **PRONOUNS**; each of which we shall consider separately.

SECT. I. Of Substantives of the First Order, called **NOUNS**.

12. **NOUNS** are all those words by which objects or substances are denominated, and which distinguish them from one another, by names applicable to each, without marking either quantity, quality, action, or relation. And as all the objects which exist must be either in the same state that they were produced by nature, or changed from their original state by art, or abstracted from substances by the powers of imagination, this naturally suggests a division of nouns into **NATURAL**, as *man, vegetable, tree, &c.*; **ARTIFICIAL**, as *house, ship, watch, &c.*; **OF ABSTRACT**, as *whiteness, temperance, &c.*

13. But the diversity of objects being so great as to render it impossible for any person to know the distinct names of every individual, therefore it has been found expedient to arrange them under certain general classes, the names of which may be more easily acquired, so that by referring any unknown object to the class to which it belongs, we in some measure supply the want of proper names. Hence, therefore, each of the above species of nouns are divided into those which denote genera, species, and individuals. Thus, in natural substances, *animal, vegetable, and fessile*, denote genera; *man, dog, tree, metal*, are species; and *Alexander, Caesar, oak, gold*, are individuals. In artificial substances, *edifice* is a genus; *house, tower, church*, are species; and *the Vatican, Tron-church, and Herriot's-hospital*, individuals. In abstract substances, *motion* is a genus; *flight and course*, are species; *the flight of Mahomet, the course of a grey-hound*, are individuals. Each of these general classes might be subdivided into many smaller; but as these lesser divisions can only relate to the particular genius of different languages, it does not fall within our plan to consider them. We therefore proceed to take notice of the accidents which accompany nouns. Of which kind may be reckoned *number* and *gender*.

14. As nouns are the names of *substances*, and as there may be many substances of the same kind, therefore nouns must be adapted to express whether there is one or more of those objects of which we speak. Nouns, therefore, in every language, admit of a certain variation to denote this circumstance, which is called *number*. Thus, in the English language, when we speak of a single place of habitation, we call it *a house*; but if of more, we call them *houses*. In the first of these cases the noun is said to be in the *singular*, and in the last case the *plural* number: nor does the English, or any other language except the Greek, admit of any other variation but these two: and altho' the Greek language admits of a particular variation of the

Of nouns.

the noun called the *dual* number, which is a plural limited to two objects; yet this cannot be considered as essential to language; and it is perhaps doubtful whether this variation ought to be considered as an elegance or a defect in that language.

15. But although number be a natural accident of nouns, it can only be considered as essential to those which denote genera or species, as it does not descend to individuals. Thus we say, *animal*, or *animals*, *vegetables*, and *soffits*; as also *man*, or *men*, *dogs*, *trees*, &c. But we only say, *Xenophon*, *Cæsar*, *Bucephalus*, &c. in the singular. Nor do these admit of a plural, excepting when we consider any proper name as a general appellation under which many others are arranged, when it is no longer the name of an individual, but that of a species, and as such admits of a plural; as the *Alexanders*, the *Ptolemies*, the *Howards*, the *Pelham*s, the *Montague*s, &c. The reason of all which will be obvious, if we consider, that every genus may be found whole and entire in each of its species; for *man*, *horse*, and *dog*, are each of them an entire and complete *animal*: and every species may be found whole and entire in each of its individuals; for *Socrates*, *Plato*, and *Xenophon*, are each of them completely and entirely a *man*. Hence it is, that every genus, though *ONE*, is multiplied into *MANY*; and every species, though *ONE*, is also multiplied into *MANY*, by reference to those beings which are their subordinates. But as no individual has any such subordinates, it can never in strictness be considered as *MANY*, and so is truly an *INDIVIDUAL* as well in nature as in name, and therefore cannot admit of number.

16. Besides number, another accident of nouns is gender, the nature of which may be thus explained: As nouns are the names of the various objects in nature; and as the distinction of sex is perceptible among all those objects which are animated, and as those which are inanimate cannot admit of any sex at all; therefore all the beings which can become the objects of our speculation, may be considered as either *males* or *females*, or such as admit of *no* sex, and therefore may be said to be neuter, or of *neither* sex. Hence, therefore, grammarians have made a threefold distinction of nouns, into *masculine genders*, or those which denote *males*; *feminine*, or those which denote *females*; and *neuters*, which denote those substances that admit of no sex. But, although the origin of genders is thus so clear and obvious; yet every language that we know of, except the English, deviates from the order of nature, and often attributes sex to those substances which are totally incapable of any: nay, some languages are so particularly defective in this respect, as to class every object inanimate as well as animate under either the *masculine* or *feminine* gender, as they admit of no gender for those that are of neither sex. This is the case with the French, Italian, and Spanish. But the English, strictly following the order of nature, puts every noun which denotes a male animal, and no others, in the *masculine* gender; every name of a female animal, in the *feminine*; and every animal whose sex is not obvious, or known, as well as every inanimate object whatever, in the *neuter* gender. Nor does this rule admit of any exceptions; although poets take the liberty of personifying any objects they think pro-

Of nouns.

per, and endow them with whatever sex suits their purpose best; which serves admirably to distinguish between the cool language of philosophy, and the enthusiasm of poetry.

17. Although *Cases* are not necessary accidents of nouns; yet as they have been often considered as such, it will perhaps be deemed proper to take some notice of them.—As natural objects remain the same, altho' observed from many different points of view, they are not in their own nature altered, although they may be connected with others in many different ways: their names therefore ought to remain unchanged, although their relations to other words may be varied. However, there are certain circumstances in which nouns may be considered with respect to their relation to, and connection with, other words, which occur more frequently than others. Some languages (particularly the Greek and Latin) express *some* of these circumstances by a variation of the original noun, which variations are called *CASES*. But the English, and almost all the modern languages of Europe, have followed the order of nature, and allow the noun to remain the same, expressing its relation and connection with other words by the help of distinct words called *prepositions*.—Which of these methods is best, it is not our present purpose to inquire. See *LANGUAGE*.

18. It has been supposed the English nouns admit of one variation which answers to the genitive case of the Latins.—Thus the word *Alexander* is an English noun in its proper form, and in that case which in Latin would be called the *Nominative*. The variation which they called the *Genitive Case*, is expressed in English by adding the preposition *of* before the noun; thus, *of Alexander*. But the same meaning may be conveyed by the word *Alexander's*; for the meaning is the same, if I say the house of *Alexander*, or *Alexander's* house. This, therefore, has been called a true inflection of the original noun. However, although this opinion has been adopted by all grammarians, it appears to have been adopted without sufficient examination, as will be evident from the following considerations.

There are certain circumstances in which this supposed genitive cannot be substituted instead of the other: for I may say, I speak of *Alexander*, I write of *Cæsar*, I think of *Pompey*; but I cannot say, I speak *Alexander's*, I write *Cæsar's*, or I think *Pompey's*. Hence these two are not in all cases synonymous terms; and therefore one of them must be considered as only accidentally coinciding with the other in particular circumstances.

Again, every one of these supposed genitives can with propriety assume all the various signs of the different *cases* in the English language; for we may say simply, as in the nominative case, *Alexander's* house; but we can also say, *of Alexander's* house, *to*, *with*, *from*, *in*, *by*, or *for Alexander's* house, &c. If this then be a real genitive, it requires the sign of the genitive, as well as of the other cases, to explain it; which would be an absurdity too great to be admitted.—But it may be asked, If these are not genitives, to what class of words can they be referred?

In answer to this, it has been already observed, that the variety of substances is so great, that it is

im-

impossible for any person to know the names of every one of them; and therefore, they have been arranged under the several orders of genera and species. We now further observe, that as the individuals are so exceedingly numerous, it would be impossible even to invent proper names for each, and far less would it be possible to make these names be known to every person who might accidentally see them: therefore, when we want to ascertain any individual object, and distinguish it from all the other individuals of the same species, we are obliged to have recourse to particular epithets, or definitives, to ascertain that individual.—Thus, I see a particular house which I want to distinguish from other houses: this has no particular name of its own: I must therefore ascertain it in the best manner I can: and as the shortest is always the best, we most naturally denominate it from its owner or possessor if we know him; and therefore call it *Alexander's*, *James's*, or *John's*, house.—Here then we see, that the words *Alexander's*, *James's*, and *John's*, do not stand as nouns, but as articles or definitives serving to ascertain and point out the individuality of the noun with which they are joined, and are much nearer allied to adjectives than to substantives. These, therefore, like other articles, do not alter the case of the noun; so that the term *Alexander's house*, is as much the proper name of a particular house, as *Alexander* or *James* are the proper names of particular men, and of consequence may be varied through the different cases as well as the other.—It is surprising, that this idea never occurred to grammarians; for *St Peter's* at Rome, and *St Paul's* at London, are as truly the proper names of these two noble edifices, as the *Rotundo* or the *Circus* are the proper names of two other structures.—We may therefore safely conclude, that the English language admits of no cases at all, and that the only essential accidents of nouns are gender and number.

SECT. II. Of Substantives of the Second Order, called PRONOUNS.

19. ALL conversation passes between individuals. When these individuals are unknown to each other, how shall the one speaker address the other when he knows not his name; or how explain himself by his own name, of which the other is wholly ignorant? This might perhaps have been at first effected by pointing; but as it behoved this method to be extremely inconvenient and defective, it was necessary that a particular class of words should be invented for this purpose; and as these words always supply the place of a noun, they have been called PRONOUNS;—the nature of which may be explained as follows.

20. Suppose the parties conversing to be wholly unacquainted, and the subject of the conversation to be the speaker himself: here, to supply the place of pointing, the inventors of language have furnished the speaker with the pronoun *I*; *I write*, *I desire*: and as the speaker is always principal with respect to his own discourse, they have therefore called this the *pronoun* of the first person.

Again, suppose the subject of the conversation to be the party addressed: here, for similar reasons, they invented the pronoun *THOU*, *THOU writest*, *THOU walkest*; and as the party addressed is next in dignity to the

speaker, or at least comes next with reference to the discourse, they therefore called this the *pronoun* of the second person.

But as the subject of the conversation may be some third object different from either the speaker or the party addressed, another pronoun was necessary; and as this object might be either a *male* or a *female*, or a *neuter*, it was necessary to have one pronoun for each of the genders, *HE* for the *masculine*, *SHE* for the *feminine*, and *IT* for the *neuter*: and this, in distinction to the former, was called the *pronoun* of the third person.—Hence the distribution of pronouns into *persons*.

21. We have already seen that nouns admit of number; pronouns, which are their substitutes, likewise admit of number. There may be many speakers of the same sentiment, as well as one who including himself speaks the same sentiment with many; speech may likewise be addressed to many at a time as well as to one; and the subject of the discourse may likewise be many; therefore the pronoun of every one of the *persons* must admit of number, to express this singularity or plurality. Hence, therefore, the pronoun of the first person *I*, has the plural *we*; that of the second person *thou*, has the plural *you*; and that of the third person *he*, *she*, or *it*, has the plural *they*, which is equally applied to all the three genders.

22. With regard to gender, we do not find in any language that the pronouns of the *First* or *Second persons* admit of any distinction in this respect: nor was it necessary that they should; as the speaker and party addressed are usually present with one another, this distinction is generally obvious from dress and external appearance. But this is not the case with regard to the pronoun of the *Third person*; of whose character and distinctions we often know no more than what we learn from the discourse itself; and hence it is, that in almost all languages the pronoun of the third person admits of genders, as we have already seen the English admits of the triple distinction of masculine, feminine, and neuter.—The utility of which threefold distinction will be best shewn by an example. Supposing there was no such distinction, and that we should read in any history *HE* caused *HIM* to destroy *HIM*, and were told that the pronoun which is here thrice repeated stood each time for something different; that is to say, for a man, for a woman, and for a city, whose names were *Alexander*, *Thais*, and *Persopolis*. Taking the pronoun thus divested of its genders, it does not appear which of the three was destroyed, which the destroyer, or which the cause that moved to the destruction. But there is no ambiguity when we hear the genders distinguished; and when, instead of the ambiguous sentence, *he* caused *him* to destroy *him*, we are told with the proper distinctions that *she* caused *him* to destroy *it*. Then we know with certainty, that the promoter was the *woman*, that her instrument was the *hero*, and that the subject of her cruelty was the unfortunate city.—From this example we would be surprised how the *Italian*, *French*, and *Spanish*, could express themselves with precision or elegance, with no more than two variations of this person.

23. From the same causes, as a distinction of gender is unnecessary in the pronouns of the first and second persons, we see the reason why a single pronoun to each person, an *I* for the first, and a *THOU* for the second,

Pronouns.

are sufficient for all the purposes of language, as these are always supposed present and obvious. But it is not so with respect to the third person, as the various relations of different objects made it necessary to have not *one*, but *many*; such as, *HE, SHE, IT, THIS, THAT, OTHER, SOME, ALL, ANY, &c.*

24. Although we have said that there is only one pronoun for each of the first and second persons, yet the English reader may perhaps be puzzled with finding two distinct words applied to each; *I* and *ME*, for the first person; *THOU* and *THEE*, for the second. The learned reader will at once see that these two words *ME* and *THEE* are equivalent to the *accusative* case of the Latin pronoun: but, in order to make the meaning of this as plain as possible without embarrassing ourselves about unnecessary terms, we shall only observe, no effect can be produced without a cause, and no action can be performed without producing some effect. The same person may in different circumstances be either the active and efficient cause *of*, or the passive subject who suffers *by*, an action: some languages have therefore formed different words to express the same object in these different circumstances. Thus in the Latin sentences, *Brutus amavit Cassium*, Brutus loved Cassius; and *Cassius amavit Brutum*, Cassius loved Brutus; the word *Brutus* in the first, and *Cassius* in the second, is the form which the noun assumes when it is used as the efficient cause; and *Brutum* and *Cassium* the forms which the same nouns assume when they are represented as the passive subjects. This last, then, is what was called the *accusative* case of the noun, and the first was called the *nominative*. We have already seen, that the English noun admits of no cases, the active subject always preceding the verb, and the passive following it; as is plain from the above sentences, where *Brutus* and *Cassius* remain unchanged in both situations; and the same might be observed of all other modern languages: yet the English and all modern languages admit of a different word to express the different fate of the pronouns. Thus, we say, *I esteem THEE, I admire HIM, I love HER*: in all of which sentences, *I* the pronoun of the first person, is the *active*; and *THEE* of the second person, and *HIM* and *HER* of the third, are the *passive* subjects, and are therefore expressed by the words *THEE, HIM, and HER*. But if the case be reversed, and the pronoun of the first person becomes the passive subject, and the others the active, they assume a different form; thus, *THOU esteamest, HE admires, SHE loves*—*ME*. Hence, therefore, it appears that we have two distinct words for each of these pronouns to express the different states in which they may be represented, exactly analogous to the nominative and accusative cases of the Romans. Whether these are to be admitted as cases of our pronouns, or whether they may not rather be considered as distinct words formed for that particular purpose, is of little consequence for us to inquire; as, in whatever light they be considered, this variation cannot be looked upon as an essential part of language, but only as a particular refinement, invented to prevent the disagreeable repetition of the pronoun, which behaved frequently to have happened without this contrivance. This seems to be the only reason why pronouns have been endowed with this variety, and not nouns. For as nouns are in themselves greatly diversified, the sameness of sounds does not here so often occur as it

would have done in the pronouns, where the same *I, THOU, HE, SHE, or IT*, answers for the name of every object which occurs in nature; but, by this diversity in the form of the words, this circumstance is in some measure obviated. And it is probably for the same reason, that the plural of each of these pronouns is so very different from the singular. Thus, from *I* of the first person is formed *we* in the plural, and from *ME* the plural *us*; from *THOU* and *THEE* the plurals *YE* and *YOU*; from *HE, SHE, HIM, HER, and IT*, the plurals *THEY* and *THEM*. In all of which there is not the least resemblance between the singular and plural of any one word; and, except in *HE* and *HIM, THEY* and *THEM*, there is not any similarity between what may by some be thought to be the different cases of the same word.

25. We have seen that the same object may sometimes be the cause of an action, and sometimes the object which suffers by it. We now observe, that the same object may sometimes be, with regard to the same action, both the active cause and passive subject: as when we say, *Brutus killed himself*. In which case it is evident, that Brutus was both the cause that produced, and the object that suffered by the action; the pronoun *himself* being put for his name: for, were it not for the sameness of the sound, and the ambiguity which would be occasioned by it, we might surely say, *Brutus killed Brutus*. It was therefore necessary to have a particular pronoun for the passive subject, in all those cases where the same object was the agent; and on this account the word *SELF* has been invented, having the plural *SELVES*. This pronoun therefore, which serves on all occasions to represent the action as returning upon the agent that produced it, may be called the *reciprocal pronoun*; which has this peculiarity, that it can never stand by itself, but must always have the assistance of the pronoun in whose place it is substituted; as, *MYSELF, THYSELF, HIMSELF, HERSELF, ITSELF*, with their plurals. But although this seems to have been the original use of this pronoun; yet, in the English language, its use has been extended further; and from its always having a reference to the agent of any action, it has been employed to denote that agent by way of emphasis, as performing the action without the aid or assistance of any other; as, *he himself went*. And from this circumstance it has been further extended to denote any object as performing or suffering any thing which we would not naturally have expected from its known character or nature; as in this sentence: "The most daring of mankind are sometimes startled before they venture upon the commission of any extraordinary crime; even Cæsar himself felt the utmost perturbation of mind before he dared to pass the Rubicon."

26. These are all that can be properly called *personal pronouns*; but there are others which are derived from them, called *possessive pronouns*, as, *MY, THY, MINE, HIS, HER'S, ITS, &c.* the nature of which it will be necessary here to explain. We have already shewn how nouns, when they came to denote possession, were no longer to be considered as nouns, but rather as definitives or articles; so the pronouns which we here consider, being the real substitutes of *nominal* articles, ought also to be considered as a distinct class of *pronominal* articles; for as these never, in any case, can be

sub-

PRONOUNS. substituted for a noun, they cannot be considered as pronouns. Grammarians have been led into the mistake of placing them under this head, because they are the substitutes of these words, which, although they assume the appearance of nouns, only perform the part of definitives. Thus we have seen, that when we say, *Alexander's house*; the word *Alexander's* can only be considered as a definitive: and, in the same manner, if Alexander was the speaker, he might say, *my house*; if the party addressed, it would be, *thy house*; or if any third person, *his*, and in the same manner *hers* or *its*, *house*. In all which cases this possessive pronoun is substituted for that word which only serves to define and ascertain the identity of the noun; and not for the noun itself, which must always be either exprest or understood. Hence the reason why one pronoun becomes the substitute of this noun and its proper definitive, whether that definitive appears in the form of a noun or pronoun: for I can say, "*Alexander's house* is more elegant than *Mary's*," or *his house* is more elegant than *hers*, although *IT* neither is so commodious nor agreeable to live in." In which example it is plain, that the words *his* and *hers* are strictly the substitutes only of *Alexander's* and *Mary's*, and nothing more; whereas the pronoun *IT* is the substitute of the whole noun with its definitive *Alexander's house*. The other class of pronouns possessive, *MINE*, *THINE*, &c. as they do not so much serve to distinguish individuals, as to ascertain the property of the thing spoken of, which may, in a certain sense, be considered as an attribute thereof, are more nearly allied to attributives, and have therefore by some been called *adjectives*. And it must be acknowledged, that these two classes of words are so nearly allied to one another, that it is difficult to ascertain, in all cases, the precise boundary between them.

27. Besides these, there are other words which sometimes assume the province of pronouns, and are generally considered as belonging to this class, although in many cases improperly; such as, *THIS*, *THAT*, *ANY*, *SOME*, *THESE*, *THOSE*, *ALL*, and some others, which may be called *improper pronouns*. To distinguish when they may be considered as pronouns, we may observe, that when they stand by themselves, and supply the place of a noun, as when we say, *this is virtue*, give me *that*, then are they pronouns. But when they are associated to some noun, as when we say, *this habit is virtue*, or *that man defrauded me*; then, as they do not supply the place of a noun, but only serve to ascertain one, they fall rather under the species of *definitives*, or *articles*. And indeed it must be confessed, that these, as well as the possessive pronouns, are more properly adapted to define and ascertain individuals among nouns, than to supply their place; and therefore are oftener to be considered as articles than as pronouns. The best rule to distinguish when they are to be considered as the one or the other, is this. The genuine pronoun always stands by itself; assuming the power of a noun, and supplying its place. The genuine article never stands by itself; but appears at all times associated to something else, requiring a noun for its support, as much as attributives or adjectives.

28. The three orders of pronouns already mentioned, may be called *prepositive*; because they are capable of

introducing or lending a sentence, without having reference to any thing previous. But there is another order of pronouns which can never be employed but to connect sentences, and must therefore always have a reference to some sentence that precedes them; as, *who*, *which*, *what*. The nature of which may be explained as follows.

29. Suppose I say, *light is a body*; *light moves with great celerity*: these would apparently be two distinct sentences. But if, instead of the second *light*, I were to place the prepositive pronoun *it*; and say; *light is a body*, *it moves with great celerity*; the sentences would still be distinct, and two. But if I add a connective, (as for example, *and*) saying, *light is a body*, *and it moves with great celerity*; I then, by connection, make the two into one. Now it is in the united powers of a connective and another pronoun, that we may see the force and character of the pronoun here treated of. For if, instead of the words *and it*, we substitute *that* or *which*; saying, *light is a body which moves with great celerity*; the sentence still retains its unity, and becomes, if possible, more compact than before. We may therefore call this pronoun the *subjunctive*; because it cannot introduce an original sentence, but only serves to subjoin one to some other which is previous.

30. The application of this *subjunctive*, like the other pronouns, is universal. It may be the substitute of all kinds of substantives, natural, artificial, or abstract; general, special, or particular: for we may say; *The man who*, *the ship which*, *Alexander who*, *virtue which*, &c. Nay, it may even be the substitute of all the other pronouns, and is therefore of course expressive of all the three persons. Thus we say, *I who now write*, *thou who now readest*, *he who now heareth*, &c. And thus the *subjunctive* is truly a pronoun from its substitution; there being no substantive existing in whole place it may not stand. At the same time it is essentially distinguished from the other pronouns by this particular, that it is not only a *substitute*, but likewise a *connective*.

31. As to the accidents of this pronoun: From its performing the part of a connective, it of course follows, that neither *gender* nor *number* can be considered as essential to it; because these are always exprest in the preceding parts of the sentence to which it refers; nor do we in fact find, that this pronoun, at least in modern languages, admits of any distinction to denote *number*, although the English language admits of one variation for the *gender*; as we employ *who* for the *masculine* and *feminine*, and *which* for the *neuter gender*, thus: *The man*, or *the woman*, *who went to Rome*; *the tree which stands on yonder plain*, &c. It likewise admits of a variation similar to that of the accusative case; at least when applied to males or females. For when the object, which it represents is the efficient cause of action, it is *who*; as, *the man who fell*, &c.; but when it is the passive subject, it then, in certain circumstances, takes the form of *whom*; as, *the man of whom I speak*; although, this is not universal; as we likewise say, *the man who was beaten*. But the neuter admits of no such distinctions, as we equally say, *the tree which fell*, or *the tree of which I spoke*. But both of these admit of a variation to denote possession or qualities, which is the

Verbs.

word whose for all genders. Thus we say, *Socrates whose only study was virtue; Elizabeth, whose reign was glorious.*

32. To conclude: We have seen that substantives are either *primary* or *secondary*; or, in other words, **NOUNS**, or **PRONOUNS**. The **NOUNS** denote substances, either *natural, artificial, or abstract*; and these either *general, special, or particular*. The **PRONOUNS**, their substitutes, are either *prepositive* or *subjunctive*: the **PREPOSITIVE** is distinguished into three orders, called the *first*, the *second*, and the *third* persons; the **SUBJUNCTIVE** includes the powers of all the three, having *superadded*, as of its own, the peculiar force of a connective.

CHAPTER II. OF ATTRIBUTIVES.

33. As all attributives must either be expressive of the attributes of SUBSTANCES, or of other ATTRIBUTES, we divide this class into two kinds: calling those of the first kind, ATTRIBUTIVES of the FIRST ORDER; and those of the second kind, ATTRIBUTIVES of the SECOND ORDER.

SECT. I. Attributives of the First Order.

34. ATTRIBUTIVES are all those principal words that denote *attributes* considered as attributes. Such, for example, are the words, *black, white, great, little, wise, eloquent, to write, to walk, to speak, &c.* all of which are the *attributes of substances*. Thus *black* is an attribute of *jet*, *white* of *snow*;—*wise* and *eloquent*, as also, *to write* and *to speak*, are attributes of *men*.

In examining the different attributes of substances, we readily perceive that some of them have their essence in *motion*: such are, *to walk, to fly, to strike, to live, &c.* Others have it in the *privation of motion*; as, *to stop, to rest, to cease, to die, &c.* And others have it in subjects that have *nothing to do* with either *motion* or its *privation*; such are the attributes of *great and little, wise and foolish, white and black*, and, in a word, the several *quantities and qualities* of all things. This therefore furnishes a natural division of attributives of this order; and grammarians have called all those, whose essence consists in *motion* or its *privation*, **VERBS**; and all the others have been called **ADJECTIVES**; each of which we shall consider separately.

I. OF VERBS.

35. **VERBS** are all those principal words which denote *attributes*, whose essence consists in *motion, or energies*, (for we choose to make use of this last term, as it implies the exertions of the mind as well as those of the body), or their *privation*. This order of attributives differs from the order called *adjectives*; not only in the particular above-mentioned, but also because adjectives denote only qualities or quantities, which do not admit of any change of state; whereas the verbal attributives may be considered as in several different states, and therefore admit of several variations in the term employed to express these. It may, in the first place, be considered as a simple attribute or energy, without particularizing any circumstance relating to the state it may be in; as in the word *write*. Or, in the second place, as these are all attributives which denote motions or energies, they may

Verbs.

be represented as in the state of actual motion or exertion; as in the word *writing*. Or, lastly, the motion or energy may be finished, and its effect completed; as in the word *written*. Hence, therefore, every verb admits of a threefold variation in every language, in each of which languages they are distinguished by some particular names. Our grammarians have given the name of the INFINITIVE MODE to the original verb itself, and the other two variations of it are both distinguished by the name of PARTICIPLES; that variation which exhibits the verb in its state of energy being called the PARTICIPLE PRESENT OF ACTIVE, and the other variation is called the PARTICIPLE PERFECT OF PASSIVE.

36. These variations of the verb are founded in the nature of things, and therefore must be found in every language under some form or other. As to the other supposed variations of verbs relating to person, number, time, &c. the slightest reflection on this subject will shew, that a verb, considered as a simple attributive, can admit of none of these affections, but must for ever remain the same at all times and in all situations whatever; for who does not see, that the attribute *to write* is the same whether it is possessed by *you, by me, or by any number of different persons*? Nor does this attribute suffer any change, whether it is represented as having been exerted *a thousand years ago, or at this present moment, or at any other assignable period of duration*; but, like every other attribute, it must remain for ever the same. For however *substances* may vary with time, and be incessantly changing; yet *attributes* of every sort are altogether beyond its power. And we must easily perceive, that the attribute which is expressed by the word *goon*, is the same now as it was at the creation, or will be while the world exists. And in the same manner, *to walk, to write, to fly*, denote attributes, which must each of them preserve their own particular nature during all the successive ages of time. Hence therefore we see, that the verbal attribute must for ever remain in that state, or modification, in which it is at first represented. Nor can it suffer any change, however different the circumstances may be in which it can be applied in language. All, therefore, that can be said of these several variations with which grammarians have usually endowed verbs, is this, That, as an attributive, it hath such an intimate connection with a substantive, as necessarily to be united with one, before it can make a principal figure in language: and as that union may be represented as taking place at different times, and under different circumstances, the inventors of some languages have contrived to express these different connections by a single word, instead of doing it by different words, as the thing in itself would naturally require; in the same manner as those who use the short-hand method of writing, make a single character express a whole word or sentence: And as it was most natural for the contrivers of these words to derive them from the verb itself of which they are compounded, they have each of them become a *real* variation of the original word which expresses the verbal attribute; and, from this being a variation of the verbal word, they have at last come to be considered as an *essential* variation of the verb itself, which has occasioned those contradictory definitions, and that confusion of ideas, which we meet with

with among all writers on this subject. But as we here consider language as in itself, without regarding the particular forms under which it may appear, we must reject all these variations of *persons*, *numbers*, *modes*, and *tenses*, which the verb itself has usually been supposed to undergo; and consider them, not as essential variations of the verb itself, but as variations produced in language by the combination of the verb with other parts of speech; and, therefore, relating to *syntax*, and of course belonging to those grammatical disquisitions alone which treat of the peculiarities of any particular language. But as these variations have been so universally considered as essential parts of the verb itself, and as the terms which this division of the verb have introduced into grammar are so frequently to be met with, it will be necessary to explain, in some measure, the meaning of these several terms.

37. In the natural world, no attribute can possibly exist without a substance to which it belongs, nor any substance without possessing certain attributes. So necessary and intimate is the connection between these, that it is as impossible to separate them, as to create or annihilate the several substances that possess these attributes. But although we are thus circumscribed as to our bodily powers, the mind admits not of such limitation; but can, with the utmost facility, separate every quality from every object whatever, and consider them apart; as, *colour* without *superficies*, *superficies* without *solidity*, or *weight* without *matter*, &c. and, when thus separated, apply them to what objects, and in what manner, it pleases. In this manner the mind abstracts those attributes which denote *motions* or *energies* from their *agents* or *energizers*, in the same way as it abstracts *qualities* from their *substances*. And it is these energies thus abstracted, which form that species of words called *verbs*; in the same manner as those attributes which denote *quantities* and *qualities* abstracted from their necessary substances, form *adjectives*. Thus, the term *to walk*, denotes a particular *energy* as considered perfectly apart from every *energizer*, in the same manner as the word *good* denotes a certain *quality* without regard to any particular *substance*.

38. Here then we discover a most essential difference between the order of nature, and that representation of it which man makes by means of words. For in *nature*, every quality must at all times be united with some substance, nor can ever be exhibited separate from it; but in *language*, every attributive, if it be considered at all, must be separated from the object to which it naturally belongs. Hence we see the reason why, in language, every *energy* and *energizer*, not only may be considered separately, but *must* for ever remain separate, unless they be united by some other power than what is necessarily their own. For the attribute *to write*, can no more be united to *man* its proper *energizer*, than a motion could commence without a cause; and till this attribute is united to its proper *energizer*, it must remain in a great measure dead and inefficacious in language.—To communicate life and energy, therefore, to this inert attribute, it must be united to its proper *energizer*; which can only be effected by the help of an assertion of the speaker himself; which may be considered as the same with regard to language, as life is in the natural world.

39. It is evident, that, by the assistance of an assertion, the speaker is enabled to unite any energy to any particular *energizer*, and thus, without making any change upon the attribute itself, represent a variety of changes produced upon other bodies by its means.—Thus, if I say, *I write*, what do I more than assert that I myself am possessed of that particular attribute denoted by the verb *to write*? If I say, *You write*, or *He writes*, what do I more than assert that another person is possessed of that particular attribute or energy?—If I say, *He did write*, I only assert that the same attribute was possessed at another time, by the same person, as before. Hence, therefore, by the help of this assertion of the speaker, we are enabled to join this particular attribute to many different *energizers*, as well as to represent these different combinations as occurring at many different times; so that the same attribute may thus be made to appear under a great many different circumstances, and exhibit a great variety of changes upon other objects, although itself remains unchanged; the several variations which we perceive, only relating to the objects with which it is combined, or the means by which that union is effected.—In the same manner it often happens, that any object in nature, a house, for example, may appear extremely different when viewed from different situations.

40. From the intimate connection that takes place between the energy, the *energizer*, the assertion, and time, these several accessories have been considered as essential parts of the verb; and therefore some grammarians have defined a verb to be *A word denoting an energy, with time, and an assertion*. But if we were thus to confound things with those which may necessarily accompany them, we could never arrive at a clear perception of any subject whatever. But not to enter into the arguments that might be produced to shew the impropriety of this definition, we shall only observe, that by the universal acknowledgment of all grammarians this cannot be just. For they unanimously agree, that the *infinitive mode* is not only a part of every verb, but the *most essential part*; as it forms the root from which all the other parts are derived. But as this mode neither denotes either time or an assertion, it is evident that these, even by their own acknowledgment, can be at best but accessories, and not essential parts of the verb.

41. From these arguments, therefore, we must conclude, that the verb itself admits of no other variations but those already taken notice of;—that before it can produce any active effect in language, like every other attribute, it must be united to some proper *energizer*;—that this union in language can never be effected but by means of an exertion of the vital powers of the speaker, whereby he either publishes his perception thereof, or his will that it should be;—and that this union may be represented as taking place at all the different times that can be assigned. These, therefore, are each of them necessary accompaniments of a verb, but each of them separate and distinct in their own nature, not only from this verb, but from one another; and it becomes an essential part of the syntax of every language, to consider the various ways in which these can be combined and affect one another.—Nay, so intimate has this connection been thought to be by some, that the contrivers of certain languages have arranged

Verbs.

Verbs.

them under particular classes, for the sake of distinctness and precision.—The form which a verb assumed, when thus varied in all the ways that their particular language would admit of, was called the CONJUGATION of the verb; the several parts of which may be understood from the following sketch.

42. When the verb is considered under the compound form of which we now speak, it can admit of variations chiefly in three respects. For, first, supposing the *attribute*, the *energizer*, and the *time* when that attribute was exerted by the energizer, to be the same; a variation may be occasioned by a change being produced in the *perception* or *volition* of the speaker, (which, for brevity, we will call the *assertion*), as in these examples: *I write*, SCRIBO; *I may write*, SCRIBAM; *do you write*, SCRIBE. The variations produced by this means have been called *MODES*. Secondly, Supposing the *attribute*, the *energizer*, and the *assertion*, to be the same; a change may be produced in the *time*, as in these examples: *I do write*, SCRIBO; *I have written*, SCRIPSI; *I shall write*, SCRIBAM, &c. The variations produced from this cause have been called *TENSES*. And thirdly, Supposing the *attribute*, the *time*, and the *assertion*, to remain unchanged, there may be a difference in the *energizer*; and this likewise admits of a division: for as the energizer may be only one or more persons, it must have a variation into *singular* and *plural* on these accounts; as in these examples: *I write*, SCRIBO; *thou writest*, SCRIBIS; *he writes*, SCRIBIT; and in the plural, *we write*, SCRIBIMUS; *ye write*, SCRIBITIS; *they write*, SCRIBUNT. The variations produced from this cause have been called *PERSON* and *NUMBER*.—These are all the variations which have been made in the Latin or Greek languages; and therefore our grammarians, who have adopted every idea they have of grammar from these languages, mention no more: but it was not necessary that they should have kept here; for an attribute is surely as susceptible of the distinction of sex as of person, so that they might have had a variation for *Gender* also; and instead of having one word SCRIBIT to answer for all the three genders, *he, she, or it writes*, they might have had three different words.—The composers of the Hebrew language have adopted this plan, and admit of two variations on this account. And the Russian language admits of a like variation in their verb for these genders; as in this example: ON ZOHELAL, *he has done*; ONA ZOHELALA, *she has done*, &c. But as the two languages above-mentioned do not admit of this distinction, therefore all the variations that our verbs are said to admit of are *MODES*, which include within them *TENSES*, which include under them *PERSONS*, under which head is included *NUMBER*; and these are all the parts into which a CONJUGATION has been divided.—As to what concerns the nature and lesser distinctions of each of these, the following general remarks may be sufficient.

43. With regard to *MODES*; as this relates solely to the *perception* or *volition* of the speaker, it necessarily follows, that there ought to be a distinct and particular *MODE* for each diversity that there can be in his manner of perceiving or willing any thing whatever, the principal of which are the following.

If we simply declare that we perceive any object, or that such a thing is or will be, without any limitation

or contingency, it forms what has been called the *DECLARATIVE* or *INDICATIVE MODE*; as, *I write*.—Again, if we simply represent it to be within our power, or to depend upon our choice, it forms two other modes, which may be called the *POTENTIAL*, as, *I can write*; or the *ELECTIVE*, as, *I may write*.—In the same manner, if the speaker represents himself, or any other object, as *determined* to perform any action, or as *compelled* to it, or as it is his *duty* to perform it; these form so many distinct modes, which may be called the *DETERMINATIVE*, as, *I will write*; the *COMPULSIVE*, as, *I must write*; and *OBLIGATIVE*, as, *I should write*. But although each of these represents the speaker as perceiving the agent under a different light with respect to the action; yet as all of them, except the *indicative*, agree in this, that however much they may represent it as the *duty* or *inclination*, &c. of the agent to perform any action with which they are associated, yet as they are all of the nature of contingents which may never take effect, they are frequently subjoined to any other verb; therefore the Latins have comprehended all of these under one mode, which they have called the *SUBJUNCTIVE*. We only take notice of this circumstance here, to shew, that however naturally sentences may be distinguished into modes, according to the different situation of the speaker; yet as the whole order of the variation of words in the conjugation of a verb is merely arbitrary, those who invent them may arrange them into what order they please, and call them by what names they may think most proper. But, however they may vary the names or external arrangement, this does not affect the things themselves. For, by whatever name the *mode* may be known which comprehends the words expressive of these several meanings, the sentences formed by these will be either *potential*, *obligative*, *compulsive*, &c. as above explained.

All these modes above-mentioned only relate to the different *perceptions* of the speaker. But as man is not only endowed with the powers of *perception*, but those of *volition* also, he must have words to express these; which forms another order of modes. As he is not only dependent himself, but has others depending upon him, he may *command*, *intreat*, *beg*, *pray*, *wish*, *inquire*.—Hence, therefore, so many different orders of modes, the *IMPERATIVE*, *REQUISITIVE*, *PRECATIVE*, *OPTATIVE*, *INTERROGATIVE*, &c. to which may be added the *VOCATIVE*. But although each of these displays a distinct affection of the speaker, yet grammarians have allotted only one variation of the verb for all of these purposes, called the *IMPERATIVE MODE*; all the other volitions being expressed by this, or some other modes, by the help of particular contrivances, which are different in different languages.

44. With regard to that variation of the verb which relates to *time*, called *TENSES*: As an action or event may be represented as happening at any assignable period of time, it is necessary to divide that duration into certain parts, that we may be able to represent the different relations which events bear to one another with respect to this particular. The first and most obvious division of time is into *present*, *past*, and *future*. But we may go farther still in our divisions of time. For as time past and future may be infinitely extended, we may in *universal time past* assume many particu-

lar

Verbs.

Verbs.

lar times past, and in universal time future many particular times future, some more, some less remote, and corresponding to each other under different relations. Even present time, however, in strict physical truth, it may be incapable of it, is by the power of the imagination brought to admit of these differences, and as necessarily implies some degree of extension, as every given line however minute: And hence it is not sufficient for language to denote INDEFINITELY mere *past, present, or future* times; but on many occasions to DEFINE with more precision what *kind of past, present, or future*, is meant.

45. Tenses, therefore, or those variations of a verb which denote a difference of time only, may be all divided into PRESENT, PAST, and FUTURE; each of which may be subdivided into DEFINITE and INDEFINITE. The *definite tenses* are those where the particular instant of time, whether present, past, or future, is pointed out. The *indefinite* are those where past, present, or future time is indicated in general, without confining it to a particular instant in either of these cases. These have been distinguished among grammarians by the name of AORISTS.—Thus when Milton makes Adam say,

*Millions of spiritual creatures walk the earth,
Unseen, both when we wake and when we sleep,*

the verb WALK means not that they were walking at that instant only when Adam spoke, but *indefinitely* in any instant whatever. So likewise, when the same author calls hypocrisy

*— the only evil which WALKS
Invisible except to God alone,*

the verb WALKS has the like aoristical signification. He WENT, he FELL, are *aorists* of the past, as they do not specify any particular instant, but refer to past time in general. So likewise in the legislative sentences, *thou shalt not kill, thou shalt not steal, &c.* the same aoristical meaning is perceived, as the prohibition does not relate to any particular time future, but is extended indefinitely to every time future.

46. But it is not sufficient for a language to denote time in this indefinite manner: it is necessary likewise that it should be capable of specifying any particular instant of time in an exact and definite manner. Thus, if, instead of the word WALK in the first sentence above quoted, we were to put ARE WALKING, it brings down the verb to denote a particular time, and specifies that these *spiritual creatures* are, at that very instant in which Adam speaks, walking upon the earth unseen. In like manner, in the second sentence, if the word WALKS were changed to IS WALKING, it denotes, that hypocrisy, at that particular instant in which the sentence was pronounced, was walking invisible upon the earth. And in the same manner, WAS WALKING, OR WILL BE WALKING, each of them denote, that these energies *were* or *will be* exerted at a particular specified time. These, therefore, form so many distinct definite tenses, under whatever technical name these may be known.

47. Here then we may see the use of that distinction of the different states of the verb, into the *verb properly so called, and participles*. For as the verb itself exhibits the word as altogether *indefinite*; when this is

joined to its proper energizer, it forms all these INDEFINITE TENSES which our language requires. Thus, *I write, I did write, I will write, I may write, I can write, &c.* each of them, although they represent the attribute as united to the energizer in *some past, present, or future* time, do not specify any particular instant, and are therefore so many aorists or indefinite tenses. Whereas in the *participle* the attribute is represented as in a state of exertion, it necessarily follows, that if it be ever united to its energizer, it must point out the particular instant when that union took effect, and of consequence form as great a variety of DEFINITE TENSES as the verb forms of indefinite. Thus, *I am writing*, necessarily implies that I am actually exerting this particular energy at the very instant that I declare it. So likewise, if I say, *I was writing*, it indicates, that at one particular instant of past duration, to which this has a reference, I was actually employed in that particular occupation. This instant is generally fixed by some collateral circumstance; as, “upon the twentieth day of August last, at twelve o’clock, *I was writing*;” or, “when the thunder broke upon the tower in my neighbourhood, *I was writing*,” &c. And the same may be said of future time; as, “to-morrow at ten o’clock *I shall be writing*,” &c. In all of which cases it is obvious, that a particular *now* or *instant* is pointed out, in which the attribute is represented as united to its proper energizer. We might here proceed to shew the various times that each of these different states of the verb might be made to indicate; the number of *tenses* that each mode admitted of; the several changes that might be produced by joining the *participle perfect* with any object; which cannot be here called the *energizer*, but the *subject*; for as the energy is by this participle represented as completed, if it has any connection with any person, as the attribute cannot be affected by any energizer after it is completed, it must of necessity affect the person, instead of being affected by it; and hence it is that the several variations produced by this participle perfect have been called the PASSIVE VOICE of the verb. But as all these particulars only relate to the construction of one particular language, it would lead us a great deal too far from the particular subject of which this article treats. We shall therefore only observe, that besides the above variations of the verb, which the Greeks and Romans have thought proper to make, the terms of which we have adopted; there are many others that they might with equal propriety have made, but which they rather chose to express by the help of other words called *adverbs*. But some other languages have gone further in this respect, and endowed their verbal word with several variations to express several other circumstances than they do. This is particularly the case with the Hebrew language, which, besides the variation for gender above-mentioned, has allotted certain other variations of its verb to express several other circumstances. Thus, *PAKAD* in that language signifies *he visited*; *PAKEDA, she visited, &c.*; *PIKKED, he visited diligently*; *HEPHKED, he made him visit*; and *HETHEPKED, he visited himself*. In this manner is every verb in that language varied; and each of these different conjugations of their verb admits of a particular variation for the passive of each.—Hence, there-

fore,

fore, the conjugation of a verb in that language admits of a great many variations which neither the Greeks nor Romans were acquainted with: for besides the distinctions of *modes, tenses, persons*, and *number*, they have divided their verb into so many distinct divisions to answer for these distinctions above mentioned, which they have denominated *KAL, PIHEL, HIPHIL, and HITHPAHEL*. with their passives *NIPHAL, RUHAL, and HOPHAL*; each of which admit of variations through all the *modes, tenses, persons, numbers, and genders* which any of their verbs admit of.

48. The only use which we meant to make of these observations on the Hebrew verbs, is this: That as the authors, who have formed their idea of grammar from the forms which the several parts of speech admit of in the Greek and Latin languages, have supposed that every variation which these languages admitted of was a natural and necessary part of language; and that therefore every language which did not admit of the same number of variations, with theirs, in every part of speech, was in so far defective and incomplete; so, for the same reason, an author who had formed his idea of grammar upon the model of the Hebrew tongue, would as naturally suppose, that the several variations which the verb admitted of in his own favourite language were essential and necessary; and that, of consequence, every language which did not admit of as many variations was imperfect and incomplete. But to any one who considers this matter with attention, it will appear, that there could be no end to these unnecessary discussions and groundless claims of fancied superiority: for if compound words have such an advantage over simple, the Chinese language, in which we are told almost every sentence has a particular compound character to express it, must be by far the most perfect in the world; but so far is this from being the case, that every one allows it to be the most imperfect and incomplete. The only method, therefore, which remains for us to consider this subject is, to disregard every particular form of language, and consider the words in themselves, as divested of every extraneous circumstance, and observe what variations they necessarily require, allowing every particular language to compound these with one another in what manner it shall think proper. It is in this manner we have considered the verbal attributives, and endeavoured to disentangle them from those unnecessary fetters with which they have been loaded, and restore them to their own original freedom.

49. Besides the variations above-mentioned, verbs have been distinguished from one another in a different manner; the names and nature of which may be thus explained.

We have already seen, that all verbs, as they denote *energies*, necessarily have reference to certain *energizing substances*. For, how could there be such energies as to *love, to fly, to wound?* &c. were there not such beings as *men, birds, swords*, &c. Farther, every energy not only requires an energizer, but is necessarily conversant about some subject. For example, if we say, *Brutus loves*, we must needs supply — *loves Cats, Cassius*, or some one. And thus it is, that every energy is necessarily situated between two substantives, an energizer which is *active* and a subject which is *passive*. If the energizer leads the

sentence, the energy has been said to follow its character, and becomes what we call a *VERB ACTIVE*: thus we say, *BRUTUS AMAT, Brutus loves*. On the contrary, if the passive subject be principal, it is said to follow the character of this too, and becomes what we call a *VERB PASSIVE*: thus we say, *PORTIA AMATUR, Portia is loved*. But in some verbs it happens, that the energy *always keeps within the energizer*, and never passes out to any extraneous subject. Thus, when we say, *Cæsar walketh, Cæsar sitteth*, it is impossible that the energy *should pass out*, because both the *energizer* and the *passive subject* are united in the *same person*. For what is the cause of this walking or sitting? it is the *will and vital powers* belonging to *Cæsar*: And what is the subject made so to move or sit? it is the *body and limbs* belonging also to the same *Cæsar*. This species of verbs have been by grammarians distinguished by the name of *VERBS NEUTER*, as if they were void both of *action* and *passion*, when perhaps they may be rather said to imply both. It is in this manner, that verbs have been distinguished into the three classes of *active, passive, and neuter*. These, however, might with more propriety be divided into two classes, which might be called verbs *TRANSITIVE*, and *NOT TRANSITIVE*; the first class including all those verbs which are usually called *active*, with the *passives* belonging to them; for it is evident, that these passives are not verbs themselves, but a variation only of a verb; and the second class including those verbs commonly called *neuter*.

Some languages, as the Greek and French, have another class of verbs, which are called by the first *VERBS MIDDLE*, and by the last *RECIPROCAL VERBS*; which are employed to denote that state of any transitive verb, when the energizer himself becomes the subject; as thus, *Brutus killed himself*, &c. But as these only express a slight variation of an accompaniment of a verb, they have no claim to be considered as a distinct species.

II. OF ADJECTIVES.

50. *ADJECTIVES* are all those words which denote attributes whose essence does not consist in motion or its privation: or, in other words, they are those words which denote the attributes of quantity, quality, and relation; such as, *many, few, great and little, black and white, good and bad, double, treble, quadruple*, &c.

As these attributes admit of no change of state, nor can be effected by the variations of time, or any other accident, but are in their own nature perfectly fixed and invariable, the words which express them ought to be in all situations and on all occasions the same. For as the qualities *good or bad, black or white*, admit of no change in their own nature, whether they be applied to a *man*, to a *woman*, to *many* or to *few*; neither ought the word which expresses any one of these attributes in strictness to admit of any alteration, whether it be joined to one or other of these substantives. So that although, in some languages, from the particular construction of the other parts of speech, it has been found necessary to endow their adjectives with the threefold distinction of *gender, number, and case*; yet this must only be considered as an accidental variation occasioned by particular circumstances, and not

adverbs.

Adverbs.

in the least essential to language, but rather a deviation from the order of nature, which would require them to be kept invariably the same in all cases. This order, the English language (which in this and almost every other case is most strictly conformable to the nature of things than any other language we are acquainted with) most strictly observes; as we say equally, *a good man, or a good woman, a good house; or good men, good houses, &c.*

It has probably been from observing that the adjectives in some particular languages are endowed with variations conformable to the gender, number, and case of their substantives, that grammarians have been led into the strange absurdity of ranging them with nouns, and separating them from verbs; though with respect to verbs they are perfectly homogeneous, and with respect to nouns they are quite the contrary. Adjectives are homogeneous with respect to verbs, as both sorts denote *attributes*; they are heterogeneous with respect to nouns, as *never properly denoting substances*.

31. Besides original adjectives, there is another class which are formed from substantives. Thus when we say, *the party of Pompey, the style of Cicero, the philosophy of Socrates*; in these cases, the party, the style, and philosophy spoken of, receive a stamp and character from the persons they respect, and actually pass into attributives, and as such assume the form of *adjectives*. And hence we say, *the Pompeian party, the Ciceronian style, and the Socratic philosophy*. In like manner, for a trumpet of brass, we say, *a brazen trumpet*; for a crown of gold, *a golden crown, &c.* Even pronominal substantives admit the like mutation; as, instead of saying the book of *me, of thee, or of him*, we say, *my book, thy book, his book, &c.* Yet it must be acknowledged, that these, as they often serve rather to define a noun than to denote any quality appertaining to it; they partake more of the nature of *articles* than *adjectives*; so that it is in many cases difficult to ascertain exactly to which class they are to be referred. But of this we have already taken particular notice.

The nature of these variations of adjectives, which have been called *degrees of comparison*, will be more properly explained under the following section.

SECT. II. Of Attributives of the Second Order, called ADVERBS.

52. As the Attributives hitherto mentioned denote the *attributes of substances*, so there is an inferior class of them which denote the *attributes only of attributes*. To explain these by examples of either kind: When we say, "*Cicero and Pliny were both of them eloquent; Statius and Virgil both of them wrote*;" in these instances, the attributes *eloquent* and *wrote*, are immediately referable to the substantives *Cicero, Virgil, &c.*: As, therefore, denoting the *attributes of substances*, we call them *ATTRIBUTIVES OF THE FIRST ORDER*. But when we say, "*Pliny was moderately eloquent, but Cicero exceedingly eloquent; Statius wrote indifferently, but Virgil wrote admirably*;" in these instances, the attributives *moderately, exceedingly, indifferently, and admirably*, are not referable to substantives, but to *other attributes*; that is, to the words *eloquent* and *wrote*: As, therefore, denoting *attri-*

butes of attributes, we call them *ATTRIBUTIVES OF THE SECOND ORDER*. These have been by grammarians, called *ADVERBS*. And indeed, if we take the word *verb* in its most comprehensive signification, as including all the words which denote the *attributes of substances*, (which was the sense in which Aristotle and many of the most ancient grammarians employed it), we shall find the name *adverb* to be a very just appellation, as denoting *a part of speech the natural appendage of verbs*. So great is this dependence in grammatical syntax, that an *adverb* can no more subsist without its *verb*, than a *verb* can subsist without its *substantive*.

53. Among the attributes of substances are reckoned quantities and qualities. Thus we say, *a white garment, a high mountain, &c.* Now some of these quantities and qualities are capable of *intension* and *remission*. Thus we say, *a garment exceedingly white, a mountain tolerably or moderately high*. Hence, then, one copious source of secondary attributives, or adverbs, to denote these two, that is, *intension* and *remission*; such as, *greatly, vastly, extremely, sufficiently, moderately, tolerably, indifferently, &c.*

But where there are different intentions of the same attribute, they may be compared together: thus, if the garment A be *exceedingly white*, and the garment B be *moderately white*, we may say, the garment A is *more white* than the garment B. In these instances, the adverb *more* not only denotes *intension*, but *relative intension*. Nay, we stop not here, as we not only denote *intension merely relative, but relative intension* *than which there is none greater*. Thus we not only say, *the mountain A is more high than the mountain B*, but that it is *the most high of all mountains*. Even verbs properly so called, as they admit of *simple intensions*, so they admit also of these *comparative ones*. Thus, in the following example, *Same he loveth more than riches, but virtue of all things he loveth most*; the words *more* and *most* denote the different *comparative intensions* of the verbal attribute *loveth*.

54. Hence the rise of *COMPARISON* of adjectives, and of its different *degrees*, which cannot well be more than the two species above-mentioned; one to denote *simple excess*, and one to denote *superlative*. Were we indeed to introduce more degrees than these, we ought perhaps to introduce *infinity*, which is absurd. For why stop at a limited number, when in all subjects susceptible of intension the intermediate excesses are in a manner infinite? There are infinite degrees of *more white*, between the first *simple white*, and the superlative *whitest*; and the same may be said of *more great, more strong, more minute, &c.* The doctrine of grammarians about three such degrees of comparison, which they call the *positive, the comparative, and the superlative*, must be absurd; both because in their positive there is no comparison at all, and because their superlative is a comparative as much as their comparative itself. Examples to evince this may be met with every where; *Socrates was the most wise of all the Athenians; Homer was the most sublime of all poets, &c.*

55. The authors of language have in some instances contrived a way to retrench these comparative adverbs, by expressing their force by an inflection of the primary

primary attributive. Thus, instead of *more fair*, they say FAIRER; instead of *most fair*, FAIREST: and the same method of composition takes place both in the Greek and Latin languages; with this difference, however, between the genius of these languages and ours, that we are at liberty to form the comparison either in the one method or the other; but, in these languages, the comparison is almost never formed by the assistance of the adverb, but always by the inflection of the adjective; and hence this inflection is always considered by them as a necessary accident of the adjective. But this method of expressing the power of the adverb has reached no farther than to adjectives, or to their participles, which are so nearly allied to adjectives. Verbs were perhaps thought to be too much diversified, to admit of more variations without perplexity.

56. Some qualities admit of comparison, others admit of none: such, for example, are those which denote that quality of bodies arising from their figure; as when we say, a circular table, a quadrangular court, a conical piece of metal, &c. The reason is, that a million of things participating the same figure, participate it equally if they do it all. To say, therefore, that while A and B are both quadrangular, that A is more or less quadrangular than B, is absurd. The same holds in all attributives denoting definite quantities, of whatever nature. For as there can be no comparison without intension or remission, and as there can be no intension or remission in things always definite, therefore these attributives can admit of no comparison. By the same method of reasoning, we discover the cause why *why no substantive is susceptible of these degrees of comparison*. A mountain cannot be said MORE TO BE or TO EXIST than a mole-hill; nor the lion A cannot be more a lion than the lion B: but the more or less must be sought for in their quantities and qualities; a mountain is more bulky than a mole-hill, and the lion A is more fierce than the lion B; the excess being always derived from their attributes.

57. Of the adverbs or secondary qualities already mentioned, those denoting intension and remission may be called adverbs of QUANTITY CONTINUOUS; *once, twice, thrice*, &c. are adverbs of QUANTITY DISCRETE; *more and most, less and least*, to which may be added *equally, proportionally*, &c. are adverbs of RELATION. There are others of QUALITY; as when we say, *HONESTLY industrious, PRUDENTLY brave; they fought BRAVELY, he painted FINELY*, &c.

58. The adverbs hitherto mentioned, are common to verbs of every species; but there are some which are confined to verbs properly so called, that is to say, to such as denote motions or energies with their privations. All motion and rest imply time and place as a kind of necessary coincidence. Hence, if we would express the place or time of either, we must needs have recourse to adverbs formed for this purpose; of PLACE, as when we say, *he stood THERE, he went HENCE, he travelled FAR*, &c.; or of TIME, as when we say, *he stood THEN, he went AFTERWARD, he travelled FORMERLY*, &c. Should it be asked, Why adverbs of time, when verbs have tenses? The answer is, though tenses may be sufficient to denote the greater distinctions of time, yet to denote them all by tenses would be a perplexity without end. What a variety of forms

would be necessary to denote yesterday, to-day, to-morrow, formerly, just now, now, immediately, presently, soon, hereafter? &c.

59. To these adverbs just mentioned may be added those which denote the intensions and remissions peculiar to MOTION, such as *speedily, hastily, swiftly, slowly*, &c.; as also adverbs of place made out of prepositions, such as *upward and downward, from up and down*. In some instances the preposition suffers no change, but becomes an adverb by nothing more than its application; as when we say, *he rides ABOUT, he was NEAR falling*, &c.

60. There are likewise adverbs of INTERROGATION: such as, *where, whence, whither, how*, &c. of which there is this remarkable, that when they lose their interrogative power, they assume that of a relative, so as to represent the relative or substantive pronoun; as in this doggerel translation of a line from Virgil,

And corn doth grow WHERE Troy town stood;
that is to say, *corn groweth in that place in WHICH Troy stood*, the power of the relative being implied in the adverb. It is in like manner that the relative pronoun becomes an interrogative; as in this line from Milton,

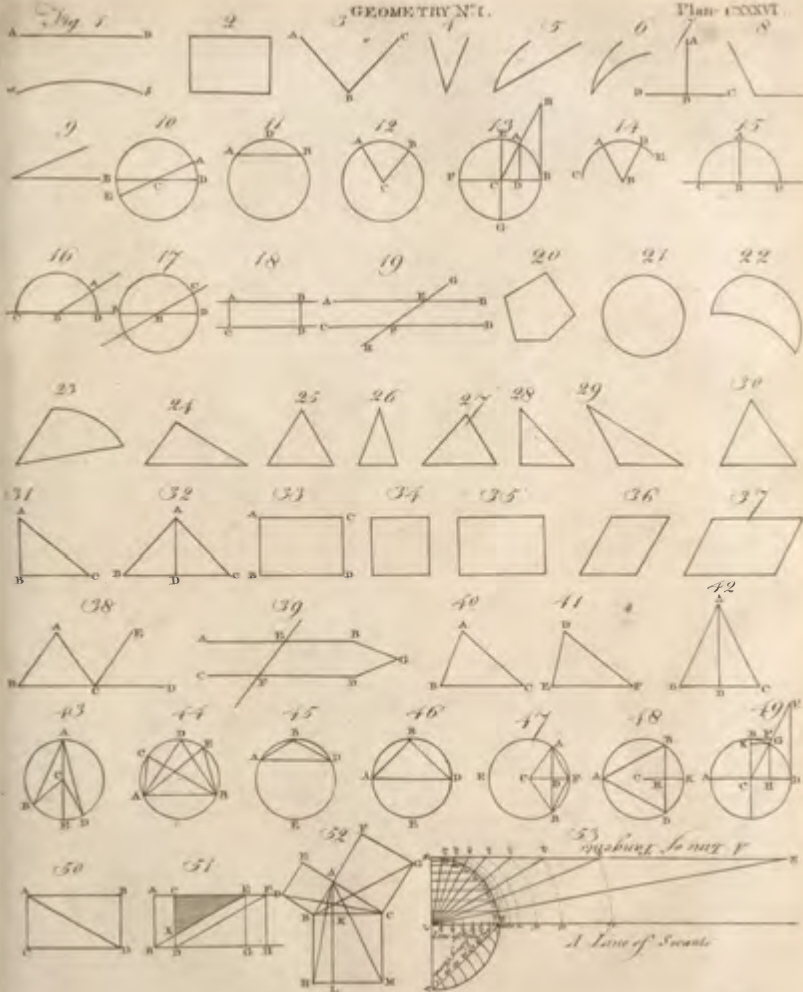
Who first seduc'd them to that soul revolt?
The reason of this is as follows: the pronoun and adverbs here mentioned are all, in their original character, RELATIVES. Even when they become interrogatives, they lose not this character, but are still relatives as much as ever: the difference is, that, without an interrogation, they have reference to a subject which is antecedent, definite, and known; with an interrogation, to a subject which is subsequent, indefinite, and unknown, and which it is expected the answer should express and ascertain. *Who first seduc'd them?* The question itself supposes a seducer, to which, though unknown, the pronoun *who* has a reference—*Th' infernal serpent*. Here, in the answer, we have the subject, which was indefinite, ascertained; so that we see *who*, in the interrogation, is as much a relative as if it had been said originally, without any interrogation at all, *It was the infernal serpent who first seduced them*: and thus interrogatives and relatives mutually pass into one another.

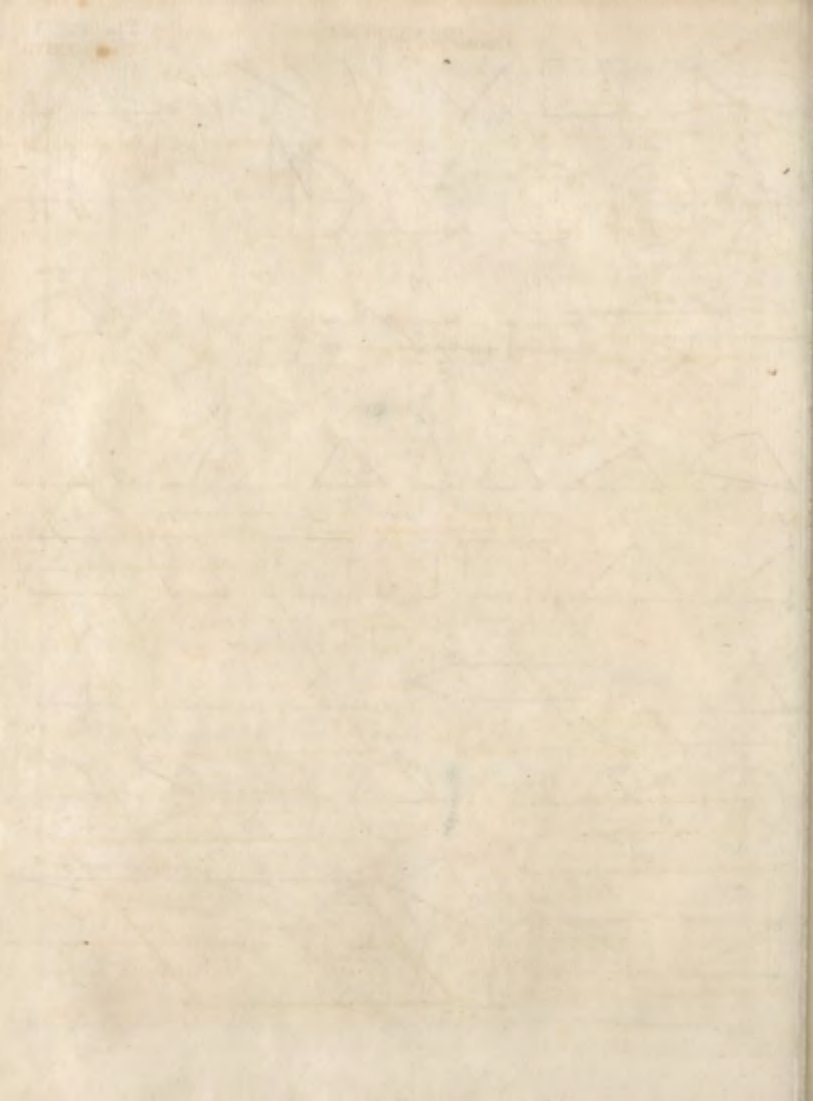
Having thus considered all those parts of speech which ARE SIGNIFICANT OF THEMSELVES, we proceed to those AUXILIARY PARTS which are ONLY SIGNIFICANT WHEN ASSOCIATED WITH OTHERS, which we have already said are either DEFINITIVES or CONNECTIVES. Of which in their order.

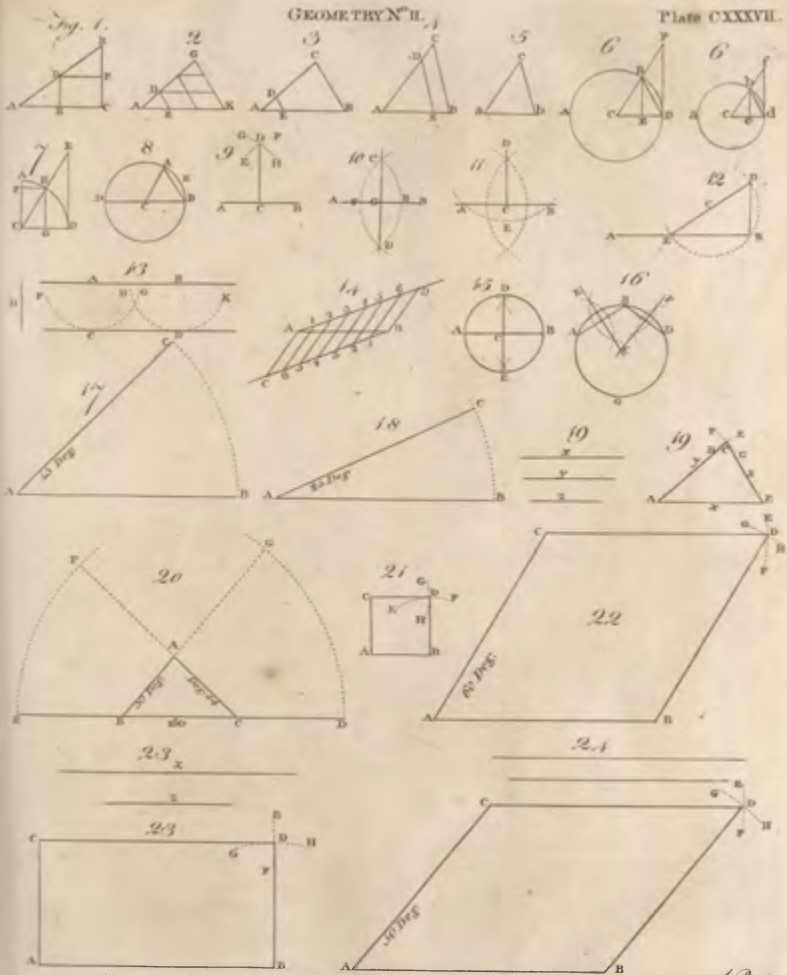
CHAPTER III.

Concerning DEFINITIVES commonly called ARTICLES.

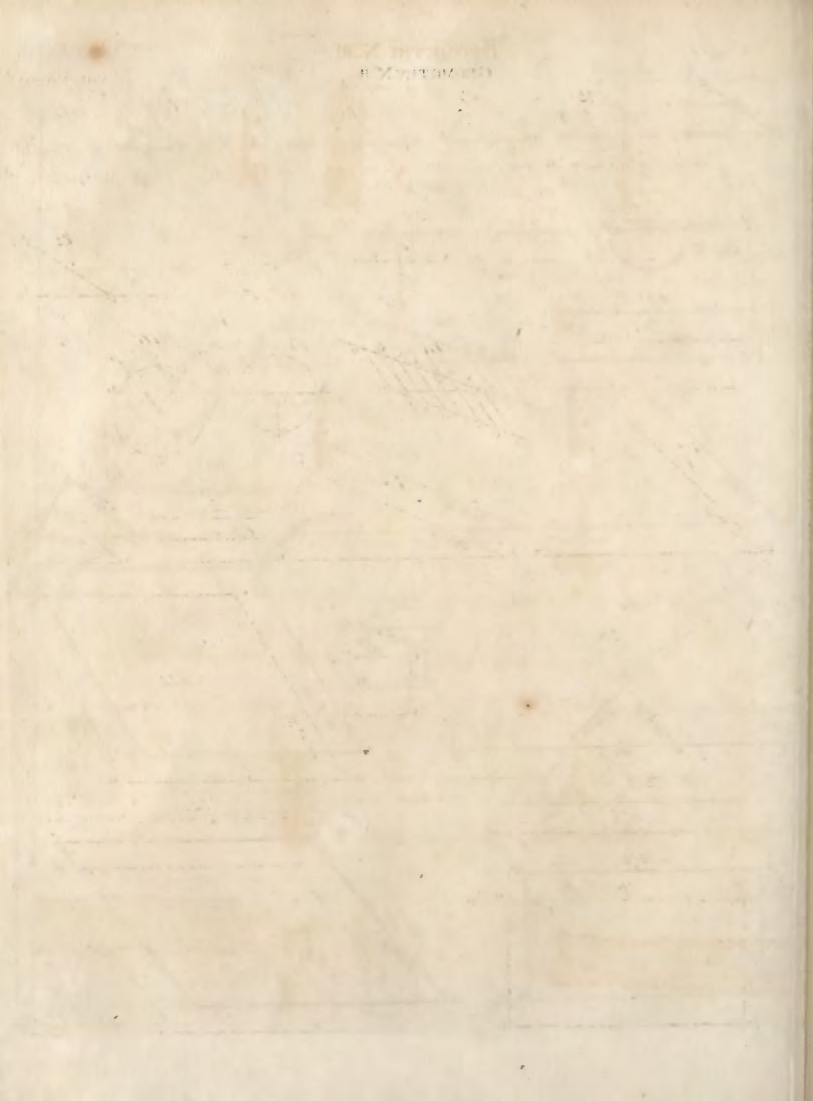
61. The knowledge of man is at best but limited and confined. Although we have invented words to denominate almost all the substances which exist, yet as it is impossible for any person to be acquainted with all of these, it was necessary to fall upon some contrivance in language to obviate the difficulties which would arise from this cause. With this view, we have already seen, that substances have been divided into general classes, each of which includes under it several lesser in







A.D.



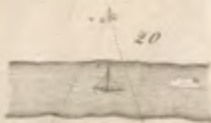
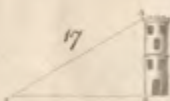
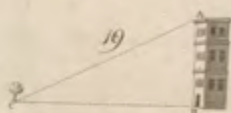
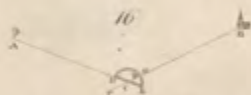
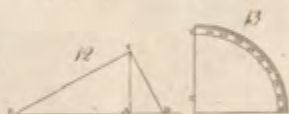
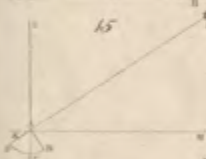
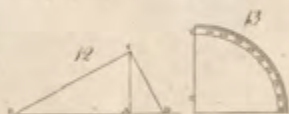
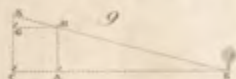
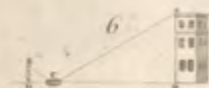
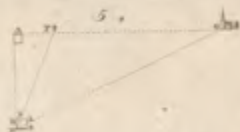
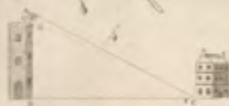
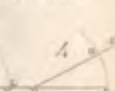
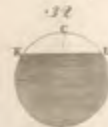
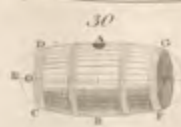
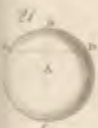
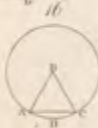
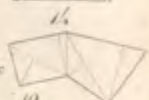
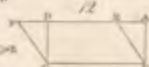
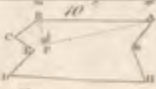
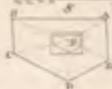
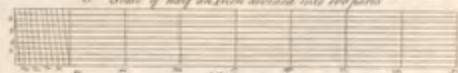


Fig. 1.



Scale of half an inch divided into 100 parts



A. Bell, Author

Articles.

Articles.

subdivisions; the names of which general classes, being but few, may be more easily retained, as *animal, edifice, motion*, &c. for by referring the several objects that we may accidentally see, and with which we are unacquainted, to the several classes to which they may belong, we are in some measure enabled to communicate our ideas without the knowledge of the particular names. But as this particular object must in some manner be distinguished from others of the same class to which it belongs, a particular class of words was found necessary to define and ascertain these individuals; which has given rise to this order of words of which we now treat, and which we have called *definitives*, because they serve to *define and ascertain any particular object, so as to separate it from the general class to which it does belong, and of course denote its individuality*. The principal of these definitives have been usually called *ARTICLES*, the nature of which may be explained as follows.

62. Supposing I see an object with which I am totally unacquainted, having a head and limbs, and appearing to possess the powers of self-motion and sensation. If I know it not as an individual, I refer it to its proper species, and call it *a dog, a horse, a lion*, or the like; and if none of the names of any species with which I am acquainted fit it, I refer it to the genus, and call it *an animal*.

But this is not enough. The object to which we are looking, and want to distinguish, is perhaps an individual. — Of what kind? *Known or unknown?* Seen now for the first time, or seen before and now remembered? It is here we shall discover the use of the two articles *A* and *THE*; for the article *A* respects our *primary* perception, and denotes individuals as *unknown*; whereas *THE* respects our *secondary* perception, and denotes individuals as *known*. To explain this by an example, I see an object pass by which I never saw till then: What do I say? *There goes a beggar with a long beard*. The man departs, and returns a week after: What do I then say? *There goes THE beggar with THE long beard*. Here the article only is changed, the rest remains unaltered. Yet mark the force of this apparently minute change. The individual once *vague* is now recognised as *something known*, and that merely by the efficacy of this latter article, which tacitly insinuates a kind of *previous* acquaintance, by referring a present perception to a like perception already past. Hence therefore we see, that although the articles *A* and *THE* are both of them *definitives*, as they circumscribe the latitude of genera and species, by reducing them, for the most part, to denote individuals; yet they differ in this respect, that the article *A* leaves the individual itself *unascertained*, but the article *THE* *ascertains the individual also*, and is for that reason the more accurate definitive of the two. They differ likewise in this respect, that as the article *A* serves only to separate one particular object from the general class to which it belongs, it cannot be applied to plurals. But as the article *THE* serves to define objects, or refer to them as already known, without relation to number, or any other circumstances, it is applicable to both numbers indiscriminately, as well as nouns of every gender, without suffering any sort of change; for it is evident, that no variation of the nature of the noun can make any difference in those words which

serve to define or denote a certain reference to them. So that although we find some modern languages which admit of a variation of their article, which relates to the gender of the noun with which it is associated, yet this cannot be considered as essential to this species of words: and so far is this from being an improvement to the language, that it only serves to perplex and confuse, as it always presents a particular idea of sex, where in many cases it is not in the least necessary.

63. Of all the parts of speech which may be considered as essential to language, there is none in which we find so many languages defective as in this. For we know of no language, except our own, which has the particular article *A*; and the Latin language has no word of the same import with the word *THE*. The reason of which deficiency is, that as other parts of speech may be so easily converted from their original meaning, and be made to assume the character of definitives, they have made some of these perform both of these offices: and as the article *A* only separates a particular object, and is therefore so nearly allied to a *numeral*, many languages, as the *French, Italian, Spanish, and German*, have made the numeral word *ONE* supply its office; while others, as the *Greek*, have denoted this particular object by a mere negation of the other article; and as the article *THE* agrees with pronouns in this respect, that they both *denote reference*, the Latins made their pronoun, by a forced periphrasis, supply the place of this. But all of these methods of supplying the want of the genuine article are defective, as will appear more particularly by and by.

64. As articles are by their nature definitives, it follows of course, that they cannot be united with such words as are in their own nature *as definitive as they may be*; nor with such words as, *being indefinite, cannot properly be made otherwise*; but only with those words which, though indefinite, are yet capable, through the article, of becoming definite. Hence we see the reason why it is absurd to say *THE I*, or *THE THOU*, because nothing can make these pronouns more definite than they are; and the same may be said of proper names. Neither can we say *THE BOTH*, because these words are in their own nature each of them perfectly defined. Thus, if it be said, “I have read *BOTH* poets,” this plainly indicates a *definite pair*, of whom some mention has been made already. On the contrary, if it be said, “I have read *TWO* poets,” this may mean *any pair*, out of all that ever existed. And hence this numeral, being in this sense *indefinite*, (as indeed are all others as well as itself,) is forced to *assume the article* whenever it would become definite. Hence also it is, that as *two*, when taken alone, has reference to some *primary and indefinite* perception, while the article *THE* has reference to some perception *secondary and definite*, it is bad language to say *TWO THE MEN*, as this would be *blending of incompatibles*, that is to say, of a *defined substantive with an undefined attributive*. On the contrary, to say *BOTH THE MEN*, is good and allowable; because the substantive cannot possibly be less apt, by being defined, to coalesce with an attributive which is defined as well as itself. So likewise it is correct to say, *THE TWO MEN*; because here the article, being placed at the beginning, *extends*

its power as well through substantive as attributive, and equally tends to define them both.

65. As some of the above words admit of no article, because they are by nature as definite as may be; so there are others which admit it not, because they are not to be defined at all. Of this sort are all INTERROGATIVES. If we question about substantives, we cannot say THE WHO IS THIS; but WHO IS THIS? And the same as to QUALITIES, and both kinds of QUANTITIES: for we say without an article, WHAT SORT OF, HOW MANY, NOW GREAT? The reason is, the article THE respects beings already known, and interrogatives respect beings about which we are ignorant; for as to what we know, interrogation is superfluous. In a word, the natural associates with articles are ALL THOSE COMMON APPELLATIVES WHICH DENOTE THE SEVERAL GENERA AND SPECIES OF BEINGS. It is these, which, by assuming a different article, serve either to explain an individual upon its first being perceived, or else to indicate, upon its return, a recognition or repeated knowledge.

66. But although proper names do not admit of the article, being in their own nature definite; yet as these often fall into homonymy, that is, different persons often go by the same name, it is necessary to distinguish these from one another, to prevent the ambiguity that this would occasion. For this purpose we are obliged to have recourse to adjectives or epithets. For example, there were two Grecian chiefs who bore the name of Ajax; and it was not without reason that Mnestheus uses epithets, when his intention was to distinguish the one from the other: "If both Ajaxes cannot be spared, (says he), at least let mighty Te-lawonian Ajax come." But as epithets are in their own nature perfectly indefinite, seeing the same adjective may be applied to infinite subjects, it is necessary to define these when we want to apply them to any particular object; so that it is necessary to endow these with an article, that they may have a reference to some single person only. And thus it is we say, Trypho the grammarian, Apollodorus the Cyrenian, &c. It is with reason, therefore, that the article is here also added, as it brings the adjective to an individuality as precise as the proper name. Even common appellatives, by the help of an article, come to have the force of proper names, without the assistance of any epithet whatever. Thus, in English, city is a name common to many places, and speaker a name common to many men. Yet if we prefix the article, THE CITY means our metropolis; and the THE SPEAKER, a high officer in the British parliament. And hence, by an easy transition, the article, from denoting reference, comes to denote eminence also; that is to say, from implying an ordinary pre-acquaintance, to presume a kind of general and universal notoriety. Thus, among the Greeks, the poet meant Homer, and the stagirite meant Aristotle; not but that there were many poets besides Homer, and many stagirites besides Aristotle, but none equally illustrious.

67. The articles already mentioned are those strictly so called; but, beside these, there are the PRONOMINAL ARTICLES, such as this, that, any, some, all, other, none, &c. Of these we have already spoken in the chapter upon Pronouns, where we have shewn when they may be taken as pronouns, and when as articles. Yet, in truth, if the essence of an article be to define

and ascertain, they are much more strictly articles than any thing else, and ought to be considered as such in universal grammar. Thus, when we say, "this picture I approve, but THAT I dislike," what do we perform by the help of these definitives, but bring down the common appellatives to denote individuals? So when we say, "some men are virtuous, but ALL men are mortal;" what is the natural effect of this ALL and SOME, but to define that universality and particularity which would remain indefinite were we to take them away? The same is evident in such sentences as these: "some substances have sensation, OTHERS want it; choose ANY way of acting, and SOME men will find fault, &c." For here, SOME, OTHER, and ANY, serve all of them to define different parts of a given whole; SOME, to denote a definite part; ANY, to denote an indefinite; and OTHER, to denote the remaining part, when a part has been already assumed. Even the attributive pronouns, my, thy, his, her's, &c. are, in strictness, more properly articles than any thing else, seeing each of them serves only to define and ascertain the individual object to which it is applied. As when we say, "my house is less commodious than YOUR'S; HER form is more elegant than HIS, &c." For, in these examples, what do the words MY and YOUR'S do, but ascertain two individual houses? or the words HIS and HER'S, but ascertain two individual forms, which are compared with one another? In the same manner, we have already seen nouns sometimes lay aside their own proper character, and become definitives, as in the words ALEXANDER'S, CESAR'S, POMPEY'S, &c. which may be said to form so many NOMINAL ARTICLES. But of these we have spoken so fully in the chapter of Nouns, that it is unnecessary to say more of them in this place.

68. Before we leave this subject, we shall produce one example to shew the utility of this species of words; which, although of themselves insignificant and seemingly of small importance, yet, when properly applied, serve to make a few general terms be sufficient for the accurate expression of a great variety of particulars, and thus makes language capable of expressing things infinite, without wandering into infinitude itself.—To explain this: Let the general term be MAN, which I have occasion to employ for the denoting of some particular. Let it be required to express this particular, as unknown; I say, a man:—Known; I say, the man:—Definite; A CERTAIN man:—Indefinite; ANY man:—Present, and near; THIS man:—Present, and distant; THAT man:—Like to some other; SUCH a man:—Different from some other; ANOTHER man:—An indefinite multitude; MANY men:—A definite multitude; A THOUSAND men:—The ones of a multitude, taken throughout; EVERY man:—The same ones, taken with distinction; EACH man:—Taken in order; FIRST man, SECOND man, &c.—The whole multitude of particulars taken collectively; ALL men:—The negation of that multitude; NO man:—A number of particulars present, and at some distance; THESE men:—At a greater distance, or opposed to others; THOSE men:—A number present and near; THESE men:—A number of individuals from another number; OTHER men:—A great number of individuals taken collectively; MANY men:—A small number; FEW men:—A proportionally greater number;

Conjunctions.

Conjunctions.

MORE men :--Smaller number; FEWER men :--And so on we might go almost to infinitude. But not to dwell longer upon this article, we shall only remark, "that minute changes in PRINCIPLES, lead to mighty changes in EFFECTS; so that PRINCIPLES are well intitled to regard, however trivial they may appear."

CHAPTER IV. OF CONNECTIVES.

69. CONNECTIVES, according as they connect either sentences or words, are called by the different names of CONJUNCTIONS or PREPOSITIONS. Of these names, that of the *preposition* is taken from a mere accident, as it commonly stands in connection before the part which it connects. The *conjunction*, as is evident, has reference to its *essential character*. We shall treat of these two separately.

SECT. I. OF CONJUNCTIONS.

70. A CONJUNCTION is a part of speech void of signification itself, but so formed as to help signification, by making two or more significant sentences to be one significant sentence. As, therefore, it is the essence of conjunctions to connect sentences; at the same time that they do this, they must either connect their meaning or not. For example, let us take these two sentences, *Rome was enslaved*—*Cæsar was ambitious*, and connect them together by the conjunction *BECAUSE*; *Rome was enslaved, BECAUSE Cæsar was ambitious*. Here the meanings, as well as the sentences, appear to be connected. But if I say, *manners must be reformed, or liberty will be lost*; here the conjunction *OR*, though it join the sentences, yet, as to their respective meanings, is a perfect *disjunctive*. And thus it appears, that though all conjunctions *conjoin sentences*, yet, with respect to the *sense*, some are *CONJUNCTIVE*, and others are *DISJUNCTIVE*.

Those conjunctions which conjoin both sentences and their meanings are either *COPULATIVES* or *CONTINUATIVES*. The principal copulative in *English* is *AND*. The continuatives are much more numerous; *IF, BECAUSE, THEREFORE, WHEREFORE, HENCE, THAT, &c.* The difference between these is this: The *copulative* does no more than barely couple sentences, and is therefore applicable to all subjects whose natures are not incompatible: *Continuatives*, on the contrary, by a more intimate connection, consolidate sentences into one continuous whole; and are therefore applicable only to subjects which have an *essential coincidence*: For example, it is noway improper to say, *Lyfippus was a statuary, and Priscian a grammarian*; the *sun shineth, and the sky is clear*; because these are things that may co-exist, and yet imply no absurdity. But it would be absurd to say, *Lyfippus was a statuary, BECAUSE Priscian was a grammarian*; though not to say, *the sun shineth BECAUSE the sky is clear*. The reason is, with respect to the first, the coincidence is merely *accidental*: with respect to the last, it is *essential*, and founded in nature.

As to the *continuatives*, they are *SUPPOSITIVES*, such as *if*; or *POSITIVE*, such as *because, therefore, as, &c.* Take examples of each:—*You will live happily if you live honestly*: *You live happily BECAUSE you live honestly*:—*You live honestly, THEREFORE you live happily*. The difference between these *continuatives* is this: The *suppositives* denote *connection*, but do not

assert actual existence; the *positives* imply both the one and the other.

These *positives* above mentioned are either *CASUAL*, such as *because, since, as, &c.* or *COLLECTIVE*, such as *therefore, wherefore, &c.* The difference between which is this: The *casuals* subjoin causes to effects; "the sun is in eclipse, BECAUSE the moon intervenes"; The *collectives* subjoin effects to causes; "the moon intervenes, THEREFORE the sun is in eclipse." We therefore use *casuals* in those instances where the effect being conspicuous we seek for its cause; and *collectives*, in demonstrations and science, properly so called, where the cause being first known, by its help we discern effects.

All these *continuatives* are resolvable into *copulatives*: For, instead of saying, *BECAUSE it is day, it is light*; we may say, *It is day, AND it is light*. Instead of *IF it is day, it is light*; we may say, *It is at the same time necessary to be day, AND to be light*. The reason is, That the power of the *copulative* extends to all connections, as well to the *essential* as to the *casual*. Hence the *continuative* may be resolved into a *copulative* and something more; that is to say, into a *copulative* implying an *essential* coincidence in the subjects conjoined.

As to *casual conjunctions*, we may further observe, that there is no one of the four species of causes which they are not capable of denoting. For example, the *MATERIAL cause*; *The trumpet sounds, BECAUSE it is made of metal*. The *FORMAL*; *The trumpet sounds, BECAUSE it is long and hollow*. The *EFFICIENT*; *The trumpet sounds, BECAUSE an artist blows it*. The *FINAL*; *The trumpet sounds, THAT it may raise our courage*. It is worth observing, that the three first causes are expressed by the strongest affirmation; because, if the effect actually be, that must be also. But this is not the case with respect to the last, which is only affirmed as a thing that may happen. The reason is, That however this may be the end which set the artist first to work, it may still be beyond his power to obtain, and which, like all other contingents, may either happen or not. Hence also it is connected by a particular conjunction, *THAT*, absolutely confined to this cause.

We now come to the *DISJUNCTIVE CONJUNCTIONS*; a species of words which bear this contradictory name, because, while they disjoin the *sense*, they conjoin the sentences.

With respect to these, we may observe, that as there is a principle of *union* diffused through all things by which this whole is kept together and preserved from dissipation; so there is, in like manner, a principle of *diversity* diffused through all, the source of *distinction*, of number, and of order. Now, it is to express in some degree the modifications of this diversity, that *DISJUNCTIVE CONJUNCTIONS* seem at first to have been invented.

Of these *disjunctives*, some are *SIMPLE*, some *ADVERSATIVE*. *Simple*; as when we say, *EITHER it is day, or it is night*:—*Adversative*; as when we say, *It is not day, BUT it is night*. The difference between these is, that the *simple* do no more than merely disjoin; the *adversative* disjoin with a concomitant opposition. Add to this, that the *adversative* are definite; the *simple* indefinite. Thus, when we say, the number

three is not an even number, BUT an odd; we not only disjoin two opposite attributes, but we definitely affirm one, and deny the other. But, when we say, *the number of the stars is EITHER even OR odd*; though we assert one attribute to be, and the other not to be, yet the alternative is, notwithstanding, left indefinite.

As to *adversative disjunctives*, it has been already said, that they imply OPPOSITION. Now, there can be no opposition of the same attribute in the same subject; as when we say, *Nereus was beautiful*. But the opposition must be either of the same attribute in different subjects; as when we say, "*Brutus was a patriot, BUT Cesar was not*;" Or of different attributes in the same subject; as when we say, "*Gorgius was a sophist, BUT not a philosopher*;" Or of different attributes in different subjects; as when we say, "*Plato was a philosopher, BUT Hippias was a sophist*." The conjunctions used for all these purposes may be called *absolute adjectives*.

But there are other adjectives besides these: as when we say, "*Nereus was more beautiful THAN Achilles*,"—*Virgil* was as great a poet as *Cicero* was an orator." The character of these latter is, that they go farther than the former, by marking not only opposition, but that equality or excess which arises from the comparison of subjects; and therefore they may be called *adjectives of comparison*.

Besides the adjectives here mentioned, there are two other species, of which the most eminent are UNLESS and ALTHOUGH: For example, "*Troy will be taken, UNLESS the Palladium be preserved*;" *Troy will be taken, ALTHOUGH Hector defend it*." The nature of these adjectives may be thus explained. As every event is naturally allied to its cause, so, by parity of reason, it is opposed to its preventive; and as every cause is either adequate or inadequate, (inadequate, when it endeavours, without being effectual), so in like manner is every preventive. Now, adequate preventives are expressed by such adjectives—as UNLESS: "*Troy will be taken, UNLESS the Palladium be preserved*;" that is, that this alone is sufficient to prevent it. The inadequate are expressed by such adjectives as ALTHOUGH: "*Troy will be taken, ALTHOUGH Hector defend it*;" that is, *Hector's* defence will prove ineffectual. These may be called adjectives ADEQUATE and INADEQUATE.

Before we leave this subject, we may observe, that the words *when* and *where*, and all others of the same nature, such as *whence*, *whether*, *whenever*, *where-ever*, &c. may be called ADVERBIAL conjunctions; because they participate the nature both of adverbs and conjunctions; of conjunctions, as they conjoin sentences; of adverbs, as they denote the attributes either of time or place. And these adverbial conjunctions (contrary to the character of accessory words, which have strictly no signification but when associated with other words), have a kind of obscure signification when taken alone, by denoting these attributes of time and place. And hence it is, that they appear in grammar like *xyrophytes* in nature, a kind of middle beings, of ambiguous character, which, by sharing the attributes of the higher and the lower, conduce to link the whole together.

SECT. II. Of those Connectives, called PREPOSITIONS.

A PREPOSITION is a part of speech devoid itself of signification, but so formed as to unite two words that are significant, and that refuse to coalesce of themselves. This connective power (which relates to words only, and not to sentences) will be better understood by the following observations.

Some things naturally coalesce and unite of themselves, while others refuse to do so without help, and as it were by compulsion. For example, all quantities and qualities coalesce immediately with their substances: thus it is we say, *a fierce lion, a vast mountain*, &c. In like manner actions coalesce with their agents, and passions with their patients: thus it is we say, *Alexander conquers, Darius is conquered*. Nay, as every energy is a kind of medium between its agent and patient, the whole three, agent, energy, and patient, coalesce with the same facility; as when we say, *Alexander conquers Darius*. Farther than this, as the greatest part of attributives themselves may be characterised, as when we say of such attributives as *ran, beautiful, learned*, &c. "*he ran swiftly, she was very beautiful, he was moderately learned*," &c. these must readily coalesce with the attributes which they thus characterise. From all which it appears, that *those parts of speech unite of themselves in grammar, whose original archetypes unite of themselves in nature*. Hence, therefore, it is, that although substances naturally coincide with their attributes, yet they absolutely refuse doing so one with another: and hence those known maxims in physics, that *body is impenetrable, that two bodies cannot possess the same place*, &c.

From these principles it follows, that when we form a sentence, the substance without difficulty coincides with the verb, from the natural coincidence of substance with energy; *the sun warmeth*: so likewise the energy with the subject on which it operates; *warmeth the earth*: so likewise both substance and energy with their proper attributes; *the splendid sun genially warmeth the fertile earth*. But suppose we are to add other substantives, as, for instance, *air, or beams*; how could these coincide, or under what character be introduced? Not either as the energizer of the verb, nor as the subject on which it operates; for both of these places are already filled up, the first by the word *sun*, and the last by the substance *earth*: not as attributes to these last, or to any other thing; for attributes by nature they neither are nor can be made. Here, then, we perceive the rise and use of prepositions: by these we connect those substantives to sentences, which at the time are unable to coalesce of themselves. Let us assume, for instance, a pair of these connectives, *through* and *with*, and mark their effect upon the substances here mentioned; *the splendid sun with his beams genially warmeth through the air the fertile earth*: the sentence, as before, remains entire and one; the substantives required are both introduced, and not a word which was there before is displaced from its proper station.

It must be here observed, that *most* if not all prepositions seem originally formed to denote the relations of place; because this is that grand relation which ba-

dies or natural substances maintain at all times to one another, whether they are contiguous or remote, whether in motion or at rest. Thus we have prepositions to denote the *contiguous relation of body*; as when we say, *Caius walked with a staff; the statue stood upon a pedestal; the river ran over a precipice*. Others, for the *detached relation*; as when we say, *he is going to Italy; the sun is risen above the hills; these figs came from Turkey*. So, as to *motion and rest*: only with this difference, that here the preposition varies its character with the verb: thus if we say, *that lamp hangs from the ceiling*, the preposition *from* assumes the character of *quiescence*; but if we say, *that lamp is falling from the ceiling*, the preposition assumes a character of *motion*. So in Milton;

— To support uneasy steps
Over the burning marble—

Again,

— He with looks of cordial love
Hung over her enamour'd.—

In the first of these examples, *over* denotes *motion*, and in the last it denotes *rest*.

But though the original use of prepositions was to denote the relations of *place*, they could not be confined to this office only; but by degrees extended themselves to subjects *incorporeal*, and came to denote relations as well *intellectual* as *local*. Thus because, in *place*, he who is *above* has commonly the advantage of him who is *below*, we transfer *over* and *under* to *dominion and obedience*: of a king we say, *he ruled over his people*; of a common soldier, *he served under such a general*: so too we say, *with thought; without attention; thinking over a subject; under anxiety; from fear; out of love; through jealousy, &c.* All which instances, with many of the like kind, shew, that the *first words* of men, like their *first ideas*, had an immediate reference to *sensible objects*; and that, in after days, when they began to discern with their *intellect*, they took these words which they found already made, and transferred them, by *metaphor*, to *intellectual conceptions*. There is indeed no method to express new ideas, but either by *metaphor*, or by *coining new words*; both which have been practised by philosophers, according to the nature and exigence of the occasion.

In the foregoing use of prepositions, we have seen how they are employed by way of *justa-position*; that is to say, where they are prefixed to a word without becoming a part of it: But they may be also used by

way of *composition*; that is, they may be prefixed to a word so as to become a part of it: thus, to *understand*, to *forget*, to *overact*, to *undervalue*, to *outgo*, &c. are so many distinct words formed by prepositions joined intimately with some other word: in all which cases, the prepositions commonly transfuse something of their own meaning into the word with which they are compounded; and this imparted meaning, in most instances, will be found resolvable into some of the relations of *place*, as used either in its *proper* or *metaphorical* acceptance.

BESIDES the above parts of speech, there is another, which cannot be comprehended under any of the foregoing classes, called *INTERJECTIONS*: of this kind are the words, *ah! alas! fie! &c.* This species of words coincide with no part of speech, but are either uttered alone, or else thrown into a sentence, without altering its form either in *syntax* or *signification*. It may be therefore objected, that as we say, that all language is divided into the several parts above enumerated, and this class cannot be comprehended in any of these divisions; of course, the analysis that we have made cannot be just, because it does not comprehend the whole. To this objection it may be answered, that the language of which we have been treating, is that which has been formed by mutual compact, for the purposes of reasoning and speculation; that, besides this artificial language, man, like every other sensitive animal, is endowed with a natural language, by which he can express any strong sensation. This language does not owe its characteristic expression to the arbitrary form of articulation; but derives its whole force from the tone of voice, and modification of countenance and gesture: and of consequence these tones and gestures express the same meaning without any relation to the articulation which they may assume, and are therefore universally understood by all mankind. Now, *interjection* is the name by which we distinguish these natural expressions: these cannot be properly called words, or parts of speech; but certain adventitious sounds, or voices of nature, expressing those passions and natural emotions which spontaneously arise in the mind upon the view or narrative of interesting events. We must, therefore, still conclude, that all language properly so called is composed of *words*, all of which may be arranged into the several classes above-mentioned; and as a recapitulation of the whole that we have said, we have annexed a *TABLE*, which presents at one view the several classes and subdivisions of words.

G R A

GRAMMARIAN, one that is skilled in, or teaches grammar.

Anciently the name *grammarian* was a title of honour, literature, and erudition, being given to persons accounted learned in any art or faculty whatever. But it is otherwise now, being frequently used as a term of reproach, to signify a dry plodding person, employed about words and phrases, but inattentive to the true beauties of expression and delicacy of sentiment. The ancient grammarians, called also *philologists*, must not be confounded with the grammatists, whose sole business was to teach children the first ele-

G R A

ments of language. Varro, Cicero, Meffala, and even Julius Caesar, thought it no dishonour to be ranked grammarians, who had many privileges granted to them by the Roman emperors.

GRAMMONT, a town of France, in the Limousin, remarkable for its abbey, which is the chief of the order. E. Lon. 133. N. Lat. 45. 56.

GRAMPOUND, a town of Cornwall in England, seated on the river Valle in W. Lon. 5. 25. N. Lat. 50. 20. The inhabitants have a considerable manufacture of gloves. It sends two members to parliament,

GRAM-

Grampus
||
Granada.

GRAMPUS, in ichthyology; a species of delphinus. See DELPHINUS.

GRANADA, a province of Spain, which for a long time was a kingdom distinct from the rest of that country, the history of which is given under the article of SPAIN. At present it is sometimes called Upper Andalusia. It is bounded to the south and east by the Mediterranean, to the west and north by Lower Andalusia, and to the north-east by Murcia. Its extent from west to east is two hundred and ten miles; but its greatest breadth exceeds not eighty. The air here is temperate and healthy; and though there are many mountains in the province, and some of them very high, yet they are almost every where covered with vines and fruit-trees, together with laurel, myrtle, sweet-basil, thyme, lavender, marjoram, and other aromatic herbs, which give an exquisite taste to the flesh of their sheep and cattle. A great deal of silk and sugar, flax and hemp, honey and wax, is also produced here; besides dates and acorns, superior to the finest nuts; good stone for building; several forts of gems; fumach, used in dressing goat-skins; and galls, of which a dye is made for leather. The valleys, with which the mountains are interperfed, are extremely beautiful and fertile. The inhabitants of some of the highest mountains are said to be descendants of the Moors; and, though they are become Roman-catholics, retain, in a great measure, their ancient customs, manners, and language. The principal rivers in the province are the Xenil and Guadaltan, besides which there are many lesser streams. Abundance of salt is made in this province; which, though neither so populous nor so well cultivated as when subject to the Moors, yet is as much so as any in Spain. It was the last of the kingdoms possessed by the Moors, and was not reduced and annexed to the crown of Castile until 1492.

GRANADA, the capital of the above province, stands at the conflux of the Xenil and Dario, in a wholesome air and fruitful country, an hundred and eighty miles south of Madrid, in W. Long. 2. 30. N. Lat. 36. 56. It is large and magnificent, containing a great number of very handsome public and private buildings. Its walls, which are adorned with many towers at equal distances, are said to be ten miles in compass. Here are two castles; the one built by the Moors, and the other by Charles V. and Philip II. They both command a very fine prospect; and the first is so large, that it looks like a city by itself, and, it is said, has room enough to accommodate forty thousand people, exclusive of the royal palace, and the convent of St. Francis. Here is also a court of inquisition; a royal tribunal; and an university, founded in 1531; with the see of an archbishop, who has a revenue of forty thousand ducats per annum. A great many noblemen, clergymen, and wealthy citizens, reside in this city, of which the silk trade and manufacture is very great, and the arsenal is said to be the best furnished of any in Spain. The inhabitants, who are partly descended of the Moors, are well supplied with water. There are several fine squares, particularly that called the Bivaramba or Plaza Mayor, where the bull-fights are held; and without the city is a large plain, full of towns and villages, called La Vega de Granada.

GRANADA, or GRENADA, one of the Caribbee islands. See GRENADA.

GRANADA, a town of America, in the province of Nicaragua, and in the audience of Guatemala, seated on the lake Nicaragua, 70 miles from the S. Sea. It was taken twice by the French buccaneers, and pillaged. The inhabitants carry on a great trade by means of the lake, which communicates with the N. Sea. W. Lon. 85. 10. N. Lat. 11. 8.

GRANADA, New, a province of South America, in Terra Firma, about 75 miles in length, and as much in breadth. It is bounded on the N. by Cartagena and St. Martha, on the E. by Venezuela, on the S. by Popayan, and on the W. by Darien. It contains mines of gold, copper, and iron; horses, mules, good pastures, corn, and fruits. It belongs to the Spaniards, and Santa-Fe-de-Bagota is the capital town.

GRANADILLOES, the name of some islands of the Caribbees, in America, having St. Vincent to the N. and Granada to the S. They are so inconsiderable that they are quite neglected; but were ceded to England by the treaty of peace in 1763.

GRANADIER, a soldier armed with a sword, a firelock, a bayonet, and a pouch full of hand-granadoes. They wear high caps, are generally the tallest and briskest fellows, and are always the first upon all attacks.

Every battalion of foot has generally a company of grenadiers belonging to it; or else four or five grenadiers belong to each company of the battalion, which, on occasion, are drawn out, and form a company of themselves. These always take the right of the battalion.

GRANADO or GRENADE, (in the art of war, a hollow ball or shell of iron or other metal, of about 2½ inches diameter, which being filled with fine powder, is set on fire by means of a small fuse, driven into the fuse-hole, made of well-seasoned beech-wood, and thrown by the grenadiers into those places where the men stand thick, particularly into the trenches and other lodgements made by the enemy. As soon as the composition within the fuse gets to the powder in the grenado, it bursts into many pieces, greatly to the damage of all who happen to be in its way. Granados were invented about the year 1594. The author of the Military Dictionary has the following remark on the use of granados. "Grenades have unaccountably sunk into disuse; but I am persuaded there is nothing more proper than to have grenades to throw among the enemy who have jumped into the ditch. During the siege of Cassel under the Count de La Lippe, in the campaign of 1762, a young engineer undertook to carry one of the outworks with a much smaller detachment than one which had been repulsed, and succeeded with ease from the use of grenades; which is a proof that they should not be neglected, either in the attack or defence of posts."—The word *granado* takes its rise from hence, that the shell is filled with grains, of powder as a pomegranate is with kernels.

GRANARY, a building to lay or store corn in, especially that designed to be kept a considerable time.

Sir Henry Wotton advises to make it look towards the north, because that quarter is the coolest and most temperate,

Granada
||
Granado.

Grandeur
and
sublimity.

temperate. Mr Worlidge observes, that the best granaries are built of brick, with quarters of timber wrought in the inside, to which the boards may be nailed, with which the inside of the granary must be lined so close to the bricks, that there may not be any room left for vermin to shelter themselves. There may be many stories one above another, which should be near the one to the other; because the shallower the corn lies, it is the better, and more easily turned.

GRANDEE, a designation given to a nobleman of Spain or Portugal.

The grandees are allowed to be covered before the king, who treats them like princes, styling them illustrious, in his letters; and in speaking to them, or of them, they are styled Eminences.

Double fig-
uration.

GRANDEUR and SUBLIMITY. These terms have a double signification: they commonly signify the quality or circumstance in objects by which the emotions of grandeur and sublimity are produced; sometimes the emotions themselves.

In handling the present subject, it is necessary that the impression made on the mind by the magnitude of an object, abstracting from its other qualities, should be ascertained. And because abstraction is a mental operation of some difficulty, the safest method for judging is, to choose a plain object that is neither beautiful nor deformed, if such a one can be found. The plainest that occurs, is a huge mass of rubbish, the ruins perhaps of some extensive building; or a large heap of stones, such as are collected together for keeping in memory a battle or other remarkable event. Such an object, which in miniature would be perfectly indifferent, makes an impression by its magnitude, and appears agreeable. And supposing it so large, as to fill the eye, and to prevent the attention from wandering upon other objects, the impression it makes will be so much the deeper. See ATTENTION.

But though a plain object of that kind be agreeable, it is not termed *grand*: it is not entitled to that character, unless, together with its size, it be possessed of other qualities that contribute to beauty, such as regularity, proportion, order, or colour: and according to the number of such qualities combined with magnitude, it is more or less grand. Thus St Peter's church at Rome, the great pyramid of Egypt, the Alps towering above the clouds, a great arm of the sea, and above all a clear and serene sky, are grand; because, beside their size, they are beautiful in an eminent degree. On the other hand, an overgrown whale, having a disagreeable appearance, is not grand. A large building agreeable by its regularity and proportions, is grand; and yet a much larger building destitute of regularity, has not the least tincture of grandeur. A single regiment in battle-array, makes a grand appearance; which the surrounding crowd does not, though perhaps ten for one in number. And a regiment where the men are all in one livery and the horses of one colour, makes a grand appearance, and consequently strikes more terror, than where there is confusion of colour and dress. Thus greatness or magnitude is the circumstance that distinguishes grandeur from beauty: agreeableness is the genus, of which beauty and grandeur are species.

Grandeur
distinguish-
ed from
beauty.

The emotion of grandeur, duly examined, will be found an additional proof of the foregoing doctrine. That this emotion is pleasant in a high degree, requires

no other evidence but once to have seen a grand object: and if an emotion of grandeur be pleasant, its cause or object, as observed above, must infallibly be agreeable in proportion.

The qualities of grandeur and beauty are not more distinct, than the emotions are which these qualities produce in a spectator. It is observed in the article BEAUTY, that all the various emotions of beauty have one common character, that of sweetness and gaiety. The emotion of grandeur has a different character: a large object that is agreeable, occupies the whole attention, and swells the heart into a vivid emotion, which, though extremely pleasant, is rather serious than gay. And this affords a good reason for distinguishing in language these different emotions. The emotions raised by colour, by regularity, by proportion, and by order, have such a resemblance to each other, as readily to come under one general term, viz. *the emotion of beauty*; but the emotion of grandeur is so different from these mentioned, as to merit a peculiar name.

Though regularity, proportion, order, and colour, contribute to grandeur as well as to beauty, yet these qualities are not by far so essential to the former as to the latter. To make out that proposition, some preliminaries are requisite. In the first place, the mind, not being totally occupied with a small object, can give its attention at the same time to every minute part; but in a great or extensive object, the mind, being totally occupied with the capital and striking parts, has no attention left for those that are little or indifferent. In the next place, two similar objects appear not similar when viewed at different distances: the similar parts of a very large object, cannot be seen but at different distances; and for that reason, its regularity, and the proportion of its parts, are in some measure lost to the eye; neither are the irregularities of a very large object so conspicuous as of one that is small. Hence it is, that a large object is not so agreeable by its regularity, as a small object; nor so disagreeable by its irregularities.

3
Demands
not strict re-
gularity.

These considerations make it evident, that grandeur is satisfied with a less degree of regularity, and of the other qualities mentioned, than is requisite for beauty; which may be illustrated by the following experiment. Approaching to a small conical hill, we take an accurate survey of every part, and are sensible of the slightest deviation from regularity and proportion. Supposing the hill to be considerably enlarged, so as to make us less sensible of its regularity, it will upon that account appear less beautiful. It will not, however, appear less agreeable, because some slight emotion of grandeur comes in place of what is lost in beauty. And at last, when the hill is enlarged to a great mountain, the small degree of beauty that is left, is sunk in its grandeur. Hence it is, that a towering hill is delightful, if it have but the slightest resemblance of a cone; and a chain of mountains not less so, though deficient in the accuracy of order and proportion. We require a small surface to be smooth; but in an extensive plain, considerable inequalities are overlooked. In a word, regularity, proportion, order, and colour, contribute to grandeur as well as to beauty; but with a remarkable difference, that in passing from small to great, they are not required in the same degree,

4
Qualities
contributing
to grandeur.

Grandeur
and
Sublimity.

degree of perfection. This remark serves to explain the extreme delight we have in viewing the face of nature, when sufficiently enriched and diversified with objects. The bulk of the objects in a natural landscape are beautiful, and some of them grand: a flowing river, a spreading oak, a round hill, an extended plain, are delightful; and even a rugged rock, or barren heath, though in themselves disagreeable, contribute by contrast to the beauty of the whole; joining to these the verdure of the fields, the mixture of light and shade, and the sublime canopy spread over all; it will not appear wonderful, that so extensive a groupe of splendid objects should swell the heart to its utmost bounds, and raise the strongest emotion of grandeur. The spectator is conscious of an enthusiasm which cannot bear confinement, nor the strictness of regularity and order: he loves to range at large; and is so enchanted with magnificent objects, as to overlook slight beauties or deformities.

The same observation is applicable in some measure to works of art. In a small building, the slightest irregularity is disagreeable: but in a magnificent palace, or a large Gothic church, irregularities are less regarded. In an epic poem, we pardon many negligences that would not be permitted in a sonnet or epigram. Notwithstanding such exceptions, it may be justly laid down for a rule, That in works of art, order and regularity ought to be governing principles; and hence the observation of Longinus, "In works of art we have regard to exact proportion; in those of nature, to grandeur and magnificence."

Sublimity.

The same reflections are in a good measure applicable to sublimity: particularly, that, like grandeur, it is a species of agreeableness; that a beautiful object placed high, appearing more agreeable than formerly, produces in the spectator a new emotion, termed *the emotion of sublimity*; and that the perfection of order, regularity, and proportion, is less required in objects placed high, or at a distance, than at hand.

The pleasant emotion raised by large objects, has not escaped the poets;

He doth bestride the narrow world
Like a Colossus; and we petty men
Walk under his huge legs. *Julius Caesar, act 1. sc. 3.*

Cleopatra. I dreamt there was an emper'or Antony:
Oh such another sleep, that I might see
But such another man!
His face was as the heav'n's; and therein stuck
A sun and moon, which kept their course, and lighted
The little O o'th' earth.
His legs bestrid the ocean, his rear'd arm
Crested the world. *Antony and Cleopatra, act 5. sc. 3.*

Majesty
Dies not alone; but, like a gulph, doth draw
What's near it with it. It's a vast wheel
Fix'd on the summit of the highest mount;
To whose huge spokes ten thousand lesser things
Are mortis'd and adjoin'd; which when it falls
Each small annexment, petty consequence,
Attends the boist'rous ruin. *Hamlet, act 3. sc. 8.*

The poets have also made good use of the emotion produced by the elevated situation of an object:

Quod si me lyricis vatibus inferes,
Sublimi feram sidera vertice. *Horat. Carm. l. 2. ode 1.*

Oh thou! the earthly author of my blood,
Whole youthful spirit, in me regenerate,
Dost with a twofold vigour lift me up,
To reach at victory above my head.

Richard II. act 1. sc. 4.

Northumberland, thou ladder wherewithal
The mounting Iolimbroke ascends my throne.

Richard II. act 5. sc. 2.

Anthony. Why was I rais'd the meteor of the world,
Hung in the skies, and blazing as I travel'd,
Till all my fires were spent; and then cast downward
To be trod out by Cæsar? *Dryden, All for Love, act 1.*

The description of Paradise in the fourth book of *Paradise Lost*, is a fine illustration of the impression made by elevated objects:

So on he fares, and to the border comes
Of Eden, where delicious Paradise,
Now nearer, crowns with her inclose green,
As with a rural mound, the champion head
With a steep wilderness; whose hairy sides
Of thicket overgrown, grotesque and wild,
Access deny'd; and over head up grew
Insuperable height of loftiest shade,
Cedar, and pine, and fir, and branching palm,
A sylvan scene; and at the rarks ascend,
Shade above shade, a woody theatre
Of stateliest view. Yet higher than their tops
The verd'rous wall of Paradise up sprung;
Which to our general eye gave prospect large
Into his nether empire, neighbor'ing round.
And higher than that wall a circling row
Of goodliest trees, loaden with fairest fruit,
Blossoms and fruits at once of golden hue,
Appear'd, with gay enamell'd colours mix'd. *l. 131.*

Though a grand object is agreeable, we must not infer that a little object is disagreeable; which would be unhappy for man, considering that he is surrounded with so many objects of that kind. The same holds with respect to place: a body placed high is agreeable; but the same body placed low, is not by that circumstance rendered disagreeable. Littleness and lowness of place are precisely similar in the following particular, that they neither give pleasure nor pain. And in this may visibly be discovered peculiar attention in fitting the internal constitution of man to his external circumstances. Were littleness and lowness of place agreeable, greatness and elevation could not be so: were littleness and lowness of place disagreeable, they would occasion uninterrupted uneasiness.

The difference between great and little with respect to agreeableness, is remarkably felt in a series when we pass gradually from the one extreme to the other. A mental progress from the capital to the kingdom, from that to Europe—to the whole earth—to the planetary system—to the universe, is extremely pleasant: the heart swells, and the mind is dilated at every step. The returning in an opposite direction is not positively painful, though our pleasure lessens at every step, till it vanish into indifference: such a progress may sometimes produce pleasure of a different sort, which arises from taking a narrower and narrower inspection. The same observation holds in a progress upward and downward. Ascent is pleasant because it elevates us; but descent is never painful: it is for the most part pleasant from a different cause, that it is according to the order of nature. The fall of a stone from

Grandeur
and
Sublimity.

Grandeur
and
Sublimity.

from any height, is extremely agreeable by its accelerated motion. We feel it pleasant to descend from a mountain, because the descent is natural and easy. Neither is looking downward painful; on the contrary, to look down upon objects, makes part of the pleasure of elevation: looking down becomes then only painful when the object is so far below as to create dizziness; and even when that is the case, we feel a sort of pleasure mixed with the pain: witness Shakspeare's description of Dover cliffs:

How fearful
And dizzy 'tis, to cast one's eye so low!
The crows and choughs, that wing the midway air,
Shew scarce so gross as beetles. Half-way down
Hangs one that galleys hamphire; dreadful trade!
Methinks he scems no bigger than his head.
The fishermen that walk upon the beach,
Appear like mice; and yon tall anchoring bark
Diminish'd to her cock; her cock, a buoy
Almost too small for sight. The murrainous surge,
That on th' unnumber'd idle pebbles chafes,
Cannot be heard so high. I'll look no more,
Left my brain turn, and the deficient sight
Topple down headlong.

King Lear, act 4. sc. 6.

A remark is made above, that the emotions of grandeur and sublimity are nearly allied. And hence it is, that the one term is frequently put for the other: an increasing series of numbers, for example, producing an emotion similar to that of mounting upward, is commonly termed an *ascending series*: a series of numbers gradually decreasing, producing an emotion similar to that of going downward, is commonly termed a *descending series*: we talk familiarly of going up to the capital, and of going down to the country: from a lesser kingdom we talk of going up to a greater; whence the *anabasis* in the Greek language, when one travels from Greece to Persia. We discover the same way of speaking in the language even of Japan; and its universality proves it the offspring of a natural feeling.

Grandeur
and sublimity
in a
figurative
sense.

The foregoing observation leads us to consider grandeur and sublimity in a figurative sense, and as applicable to the fine arts. Hitherto these terms have been taken in their proper sense, as applicable to objects of sight only: and it was of importance to bestow some pains upon that article; because, generally speaking, the figurative sense of a word is derived from its proper sense, which holds remarkably at present. Beauty, in its original signification, is confined to objects of sight; but as many other objects, intellectual as well as moral, raise emotions resembling that of beauty, the resemblance of the effects prompts us to extend the term *beauty* to these objects. This equally accounts for the terms *grandeur* and *sublimity* taken in a figurative sense. Every emotion, from whatever cause proceeding, that resembles an emotion of grandeur or elevation, is called by the same name: thus generosity is said to be an *elevated* emotion, as well as great courage; and that firmness of soul which is superior to misfortunes, obtains the peculiar name of *magnanimity*. On the other hand, every emotion that contracts the mind, and fixeth it upon things trivial or of no importance, is termed *low*, by its resemblance to an emotion produced by a little or low object of sight: thus an appetite for trifling amusements, is called a *low taste*. The same terms are ap-

Vol. V.

plied to characters and actions: we talk familiarly of an *elevated* genius, of a *great* man, and equally so of *littleness* of mind: some actions are *great* and *elevated*, and others are *little* and *groveling*. Sentiments, and even expressions, are characterized in the same manner: an expression or sentiment that raises the mind, is denominated *great* or *elevated*; and hence the *SUBLIME* in poetry. In such figurative terms, we lose the distinction between *great* and *elevated* in their proper sense; for the resemblance is not so entire, as to preserve these terms distinct in their figurative application. We carry this figure still farther. Elevation, in its proper sense, imports superiority of place; and lowness, inferiority of place: and hence a man of *superior* talents, of *superior* rank; of *inferior* parts, of *inferior* taste, and such like. The veneration we have for our ancestors, and for the ancients in general, being similar to the emotion produced by an elevated object of sight, justifies the figurative expression, of the ancients being *raised* above us, or possessing a *superior* place. The notes of the gamut, proceeding regularly from the blunter or grosser sounds, to the more acute and piercing, produce in the hearer a feeling somewhat similar to what is produced by mounting upward; and this gives occasion to the figurative expressions, a *high note*, a *low note*.

Such is the resemblance in feeling between real and figurative grandeur, that among the nations on the east coast of Africa, who are directed purely by nature, the officers of state are, with respect to rank, distinguished by the length of the baton each carries in his hand; and in Japan, princes and great lords shew their rank by the length and size of their sedan-poles. Again, it is a rule in painting, that figures of a small size are proper for grotesque pieces; but that an historical subject, grand and important, requires figures as great as the life. The resemblance of these feelings is in reality so strong, that elevation in a figurative sense is observed to have the same effect, even externally, with real elevation:

Real and
figurative
grandeur
intimately
connected.

K. Henry. This day is call'd the feast of Crispian.
He that outlives this day, and comes life home,
Will stand a-tiptoe when this day is nam'd,
And rouse him at the name of Crispian.

Henry V. act 4. sc. 8.

The resemblance in feeling between real and figurative grandeur, is humorously illustrated by Addison in criticising upon English tragedy: "The ordinary method of making an hero, is to clasp a huge plume of feathers upon his head, which rises so high, that there is often a greater length from his chin to the top of his head, than to the sole of his foot. One would believe, that we thought a great man and a tall man the same thing. As these superfluous ornaments upon the head, make a great man; a princess generally receives her grandeur, from those additional incumbrances that fall into her tail: I mean the broad sweeping train, that follows her in all her motions; and finds constant employment for a boy, who stands behind her to open and spread it to advantage." The Scotchians, impressed with the fame of Alexander, were astonished when they found him a little man.

A gradual progress from small to great, is not less remarkable

* Spectator,
No 421.

Grandeur
and
Sublimity.

remarkable in figurative than in real grandeur or elevation. Every one must have observed the delightful effect of a number of thoughts or sentiments, artfully disposed like an ascending series, and making impressions deeper and deeper: such disposition of members in a period, is termed a *climax*.

Within certain limits grandeur and sublimity produce their strongest effects, which lessen by excess as well as by defect. This is remarkable in grandeur and sublimity taken in their proper sense: the grandest emotion that can be raised by a visible object is where the object can be taken in at one view; if so immense as not to be comprehended but in parts, it tends rather to distract than satisfy the mind*: in like manner, the strongest emotion produced by elevation, is where the object is seen distinctly; a greater elevation lessens in appearance the object, till it vanish out of sight with its pleasant emotions. The same is equally remarkable in figurative grandeur and elevation; which shall be handled together, because, as observed above, they are scarce distinguishable. Sentiments may be so strained, as to become obscure, or to exceed the capacity of the human mind: against such licence of imagination, every good writer will be upon his guard. And therefore it is of greater importance to observe, that even the true sublime may be carried beyond that pitch which produces the highest entertainment. We are undoubtedly susceptible of a greater elevation than can be inspired by human actions, the most heroic and magnanimous; witness what we feel from Milton's description of superior beings: yet every man must be sensible of a more constant and sweet elevation, when the history of his own species is the subject; he enjoys an elevation equal to that of the greatest hero, of an Alexander, or a Cæsar, of a Brutus, or an Epaminondas: he accompanies these heroes in their sublimest sentiments and most hazardous exploits, with a magnanimity equal to theirs; and finds it no stretch, to preserve the same tone of mind for hours together, without sinking. The case is not the same in describing the actions or qualities of superior beings: the reader's imagination cannot keep pace with that of the poet; the mind, unable to support itself in a strained elevation, falls as from a height; and the fall is immoderate like the elevation: where that effect is not felt, it must be prevented by some obscurity in the conception, which frequently attends the descriptions of unknown objects. Hence the St Francis, St Dominics, and other tutelary saints among the Roman Catholics. A mind unable to raise itself to the Supreme Being self-existent and eternal, or to support itself in a strained elevation, finds itself more at ease in using the intercession of some faint whose piety and penances while on earth are supposed to have made him a favourite in heaven.

A strained elevation is attended with another inconvenience, that the author is apt to fall suddenly as well as the reader; because it is not a little difficult, to descend, sweetly and easily, from such

elevation, to the ordinary tone of the subject. The following passage is a good illustration of that observation:

Sæpe etiam immensum cælo venit agmen aquarum,
Et sædam glomerant tempestatem imbribus atris
Conlectæ ex alto nubes. Ruit ardens æther,
Et pluvia ingentia fata læta bonumque labores
Diluit. Implentur fossæ, et cava flumina crescent
Cum sonitu, fervetque fretis spirantibus aequor.
Ipse Pater, media nimborum in nocte, corusca
Fulmina molitur dextra. Quo maxima motu
Terra tremit: fugere feræ! et mortalia corda
Per gentes humilis iteravit pavore. Ille flagrant
Aut Atho, aut Rhodopen, aut alta Ceraunia celo
Deiecit: ingeminant austris, et densissimus imber.

Virg. Georg. l. 1.

In the description of a storm, to figure Jupiter throwing down huge mountains with his thunderbolts, is hyperbolically sublime, if we may use the expression: the tone of mind produced by that image, is so distant from the tone produced by a thick shower of rain, that the sudden transition must be unpleasant.

Objects of sight that are not remarkably great nor high, scarce raise any emotion of grandeur or of sublimity: and the same holds in other objects; for we often find the mind roused and animated, without being carried to that height. This difference may be discerned in many sorts of music, as well as in some musical instruments: a kettle-drum rouses, and a hautboy is animating; but neither of them inspires an emotion of sublimity: revenge animates the mind in a considerable degree; but it never produceth an emotion that can be termed *grand* or *sublime*; and perhaps no disagreeable passion ever has that effect.

No desire is more universal than to be exalted and honoured; and upon that account, chiefly, are we ambitious of power, riches, titles, fame, which would suddenly lose their relish did they not raise us above others, and command submission and deference: and it may be thought, that our attachment to things grand and lofty, proceeds from their connection with our favourite passion. This connection has undoubtedly an effect; but that the preference given to things grand and lofty must have a deeper root in human nature, will appear from considering, that many below their time upon low and trifling amusements, without having the least tincture of this favourite passion: yet these very persons talk the same language with the rest of mankind; and prefer the more elevated pleasures: they acknowledge a more refined taste, and are ashamed of their own as low and grovelling. This sentiment, constant and universal, must be the work of nature; and it plainly indicates an original attachment in human nature to every object that elevates the mind: some men may have a greater relish for an object not of the highest rank; but they are conscious of the preference given by mankind in general to things grand and sublime; and they are sensible, that their peculiar taste ought to yield to the general taste.

What is said above suggests a capital rule for reaching

* It is justly observed by Addison, that perhaps a man would have been more astonished with the majestic air that appeared in one of Lysippus's statues of Alexander, though no bigger than the life, than he might have been with Mount Athos, had it been cut into the figure of the hero, according to the proposal of Phidias, with a river in one hand and a city in the other. *Spectator*, No 415.

Grandeur
and
Sublimity.

Figurative
grandeur.

Grandeur
and
Sublimity.

TO
Grandeur
of manner.

* Spectator
No 415.

* Chap. 8.

reaching the sublime in such works of art as are susceptible of it; and that is, to present those parts or circumstances only which make the greatest figure, keeping out of view every thing low or trivial; for the mind, elevated by an important object, cannot, without reluctance, be forced down to bestow any share of its attention upon trifles. Such judicious selection of capital circumstances, is by an eminent critic styled *grandeur of manner* *. In none of the fine arts is there so great scope for that rule as in poetry; which, by that means, enjoys a remarkable power of bestowing upon objects and events an air of grandeur: when we are spectators, every minute object presents itself in its order; but in describing at second hand, these are laid aside, and the capital objects are brought close together. A judicious taste in thus selecting the most interesting incidents, to give them an united force, accounts for a fact that may appear surprising; which is, that we are more moved by spirited narrative at second hand, than by being spectators of the event itself, in all its circumstances.

Longinus * exemplifies the foregoing rule by a comparison of two passages.

Ye pow'rs, what madness! how on hips so frail
(Tremendous thought!) can thoughtless mortals fall?
For stormy seas they quit the pleasing plain,
Plant woods in waves, and dwell amidst the main.
Far o'er the deep (a trackless path) they go,
And wander oceans in pursuit of wo,
No care their hearts, no rest their eyes can find,
On heaven their looks, and on the waves their mind,
Sunk are their spirits, while their arms they rear,
And gods are wearied with their fruitless prayer.

ARISTEUS.

Burst as a wave that from the cloud impends,
And swell'd with tempests on the ship descends.
White are the decks with foam: the winds aloud
Howl o'er the masts, and sing through every shroud.
Pale, trembling, tir'd, the sailors freeze with fears,
And instant death on every wave appears.

HOMER.

In the latter passage, the most striking circumstances are selected to fill the mind with terror and astonishment. The former is a collection of minute and low circumstances, which scatter the thought and make no impression: it is at the same time full of verbal antitheses and low conceit, extremely improper in a scene of distress.

The following description of a battle is remarkably sublime, by collecting together, in the fewest words, those circumstances which make the greatest figure.

"Like autumn's dark storms pouring from two echoing hills, toward each other approached the heroes; as two dark streams from high rocks meet and roar on the plain, loud, rough, and dark in battle, meet Lochlin and Inisfail. Chief mixes his strokes with chief, and man with man: steel founds on steel, and helmets are cleft on high: blood bursts and smokes around: strings murmur on the polish'd yew: darts rush along the sky: spears fall like sparks of flame that gild the stormy face of night.

"As the noise of the troubled ocean when roll the waves on high, as the last peal of thundering heaven, such is the noise of battle. Though Cormac's hundred bards were there, feeble were the voice of a hundred bards to fend the deaths to future times;

"for many were the deaths of the heroes, and wide poured the blood of the valiant."

FINGAL.

Grandeur
and
Sublimity.

The following passage in the 4th book of the Iliad is a description of a battle, wonderfully ardent. "When now gathered on either side, the hosts plunged together in fight; shield is hardly laid to shield; spears crash on the brazen corselets; bosky buckler with buckler meets; loud tumult rages over all: groans are mixed with boasts of men; the slain and slayer join in noise; the earth is floating round with blood. As when two rushing streams from two mountains come roaring down, and throw together their rapid waters below, they roar along the gulph vale. The startled shepherd hears the sound, as he stalks o'er the distant hills; so, as they mixed in fight, from both armies clamour with loud terror arose." But such general descriptions are not frequent in Homer. Even his single-combats are rare. The fifth book is the longest account of a battle that is in the Iliad; and yet contains nothing but a long catalogue of chiefs killing chiefs, not in single combat neither, but at a distance with an arrow or a javelin; and these chiefs named for the first time and the last. The same scene is continued through a great part of the sixth book. There is at the same time a minute description of every wound, which for accuracy may do honour to an anatomist, but in an epic poem is tiresome and fatiguing. There is no relief from horrid langoir but the beautiful Greek language and melody of Homer's verification.

In the twenty-first book of the Odyssey, there is a passage which deviates widely from the rule above laid down: it concerns that part of the history of Penelope and her suitors, in which she is made to declare in favour of him who should prove the most dextrous in shooting with the bow of Ulysses:

Now gently winding up the fair ascent,
By many an easy step, the matron went:
Then o'er the pavement glides with grace divine,
(With polish'd oak the level pavements shine);
The folding gates a dazzling light display'd,
With pomp of various architecture'erlay'd.
The bolt, obedient to the silken string,
Forakes the staple as she pulls the ring;
The wards respondent to the key turn'd round;
The bars fall back; the flying valves resound;
Loud as a bull makes hill and valley ring;
So roar'd the lock when it releas'd the spring.
She moves majestic through the wealthy room,
Where treasure'd garments cast a rich perfume;
There from the column where aloft it hung,
Reach'd, in its splendid case, the bow unsprung.

Virgil sometimes errs against this rule: in the following passages minute circumstances are brought into full view; and what is still worse, they are described with all the pomp of poetical diction, *Æneid*, L. 1. l. 214. to 219. L. 6. l. 176. to 182. L. 6. l. 212; to 231: and the last, which describes a funeral, is the less excusable, as the man whose funeral it is makes no figure in the poem.

The speech of Clytemnestra, descending from her chariot in the Iphigenia of Euripides *, is stuffed with a number of common and trivial circumstances.

But of all writers, Lucan in this article is the most injudicious: the sea-fight between the Romans and Massilians †, is described so much in detail, without

Grandeur
and
Sublimity.

exhibiting any grand or total view, that the reader is fatigued with endless circumstances, without ever feeling any degree of elevation; and yet there are some fine incidents, those, for example, of the two brothers, and of the old man and his son, which, taken separately, would affect us greatly. But Lucan, once engaged in a description, knows no end. See other passages of the same kind, *L. 4. l. 292, to 337. L. 4. l. 750, to 765.* The episode of the forerunners Ericho, end of book 6th, is intolerably minute and prolix.

This rule is also applicable to other fine arts. In painting it is established, that the principal figure must be put in the strongest light; that the beauty of attitude consists in placing the nobler parts most in view, and in suppressing the smaller parts as much as possible; that the folds of the drapery must be few and large; that foreshortenings are bad, because they make the parts appear little; and that the muscles ought to be kept as entire as possible, without being divided into small sections. Every one at present subscribes to that rule as applied to gardening, in opposition to parterres split into a thousand small parts in the stiffest regularity of figure. The most eminent architects have governed themselves by the same rule in all their works.

11
General
terms ought
to be avoid-
ed where
sublimity is
intended.

Another rule chiefly regards the sublime, though it is applicable to every sort of literary performance intended for amusement; and that is, to avoid as much as possible abstract and general terms. Such terms, similar to mathematical signs, are contrived to express our thoughts in a concise manner; but images, which are the life of poetry, cannot be raised in any perfection but by introducing particular objects. General terms that comprehend a number of individuals, must be excepted from that rule: our kindred, our clan, our country, and words of the like import, though they scarce raise any image, have, however, a wonderful power over our passions: the greatness of the complex object overbalances the obscurity of the image.

Grandeur, being an extreme vivid emotion, is not readily produced in perfection but by reiterated impressions. The effect of a single impression can be but momentary; and if one feel suddenly somewhat like a swelling or exaltation of mind, the emotion vanishes as soon as felt. Single thoughts or sentiments are often cited as examples of the sublime; but their effect is far inferior to that of a grand subject display'd in its capital parts. We shall give a few examples, that the reader may judge for himself. In the famous action of Thermopylæ, where Leonidas the Spartan king, with his chosen band, fighting for their country, were cut off to the last man, a saying is reported of Dienees, one of the band, which, expressing cheerful and undisturbed bravery, is well entitled to the first place in examples of that kind: talking of the number of their enemies, it was observed, that the arrows shot by such a multitude would intercept the light of the sun; "So much the better, says he, for we shall then fight in the shade."

Herodotus,
lib. 7.

Somerjit. Ah! Warwick, Warwick, wert thou as we are,
We might recover all our lost again.

The Queen from France hath brought a puissant power.
Ev'n now we heard the news. Ah! couldst thou fly!

Warwick. Why, then I would not fly.

Third part, Henry VI. act 5. sc. 3.

Grandeur
and
Sublimity.

Such a sentiment from a man expiring of his wounds, is truly heroic; and must elevate the mind to the greatest height that can be done, by a single expression: it will not suffer in a comparison with the famous sentiment *Qu'il mourut* of Corneille: the latter is a tickle of indignation merely, the former of firm and cheerful courage.

To cite in opposition many a sublime passage, enriched with the finest images, and dressed in the most nervous expressions, would scarce be fair. We shall produce but one instance, from Shakspeare, which sets a few objects before the eye, without much pomp of language: it operates its effect by representing these objects in a climax, raising the mind higher and higher till it feel the emotion of grandeur in perfection:

The cloud-capt tow'rs, the gorgeous palaces,
The solemn temples, the great globe itself,
Yea all which it inherit, shall dissolve, &c.

The cloud-capt tow'rs produce an elevating emotion, heightened by the gorgeous palaces; and the mind is carried still higher and higher by the images that follow. Successive images, making thus stronger and stronger impressions, must elevate more than any single image can do.

As, on the one hand, no means directly applied have more influence to raise the mind than grandeur and sublimity; so, on the other, no means indirectly applied have more influence to sink and depress it: for in a state of elevation, the artful introduction of an humbling object, makes the fall great in proportion to the elevation. Of this observation Shakspeare gives a beautiful example, in the passage last quoted:

The cloud-capt tow'rs, the gorgeous palaces,
The solemn temples, the great globe itself,
Yea all which it inherit, shall dissolve,
And like the baseless fabric of a vision
Leave not a rack behind. — *Tempest, act 4. sc. 4.*

12
grandeur
and subli-
mity em-
ployed in-
directly to
sink the
mind.

The elevation of the mind in the former part of this beautiful passage, makes the fall great in proportion, when the most humbling of all images is introduced, that of an utter dissolution of the earth and its inhabitants. The mind, when warmed, is more susceptible of impressions than in a cool state; and a depressing or melancholy object listened to, makes the strongest impression when it reaches the mind in its highest state of elevation or cheerfulness.

But a humbling image is not always necessary to produce that effect: a remark is made above, that in describing superior beings, the reader's imagination, unable to support itself in a strained elevation, falls often as from a height, and sinks even below its ordinary tone. The following instance comes luckily in view; for a better cannot be given: "God said, Let there be light, and there was light." Longinus quotes this passage from Moses as a shining example of the sublime; and it is scarce possible, in fewer words, to convey so clear an image of the infinite power of the Deity: but then it belongs to the present subject to remark, that the emotion of sublimity raised by this image is but momentary; and that the mind, unable to support itself in an elevation so much above nature, immediately sinks down into humility and veneration for a Being so far exalted above groveling mortals.

Grandeur
and
Sublimity.

• Boileau
and Huet.

mortals. Every one is acquainted with a dispute about that passage between two French critics, the one positively affirming it to be sublime, the other as positively denying. What has been remarked, shows, that both of them have reached the truth, but neither of them the whole truth: the primary effect of the passage is undoubtedly an emotion of grandeur; which so far justifies Boileau: but then every one must be sensible, that the emotion is merely a flash, which, vanishing instantaneously, gives way to humility and veneration. That indirect effect of sublimity justifies Huet, on the other hand, who being a man of true piety, and probably not much carried by imagination, felt the humbling passions more sensibly than his antagonist did. And laying aside difference of character, Huet's opinion may perhaps be defended as the more solid; because in such images, the depressing emotions are the more sensibly felt, and have the longer endurance.

¹³
False sub-
limity.

The straining an elevated subject beyond due bounds, and beyond the reach of an ordinary conception, is not a vice so frequent as to require the correction of criticism. But false sublimity is a rock that writers of more fire than judgement commonly split on; and therefore a collection of examples may be of use as a beacon to future adventurers. One species of false sublime, known by the name of *bombast*, is common among writers of a mean genius: it is a serious endeavour, by strained description, to raise a low or familiar subject above its rank; which, instead of being sublime, fails not to be ridiculous. The mind, indeed, is extremely prone, in some animating passions, to magnify its objects beyond natural bounds: but such hyperbolical description has its limits; and when carried beyond the impulse of the propensity, it degenerates into burlesque. Take the following examples:

Sejanus.——Great and high

The world knows only two, that's Rome and I.

My roof receives me not: 'tis air I tread,

And at each step I feel my advance'd head

Knock out a star in heav'n. *Sejanus, Ben Jonson, act 5.*

A writer who has no natural elevation of mind, deviates readily into bombast: he strains above his natural powers; and the violent effort carries him beyond the bounds of propriety.

Caifford. Give way, and let the gushing torrent come;

Behold the tears we bring to swell the deluge,

Till the flood rise upon the guilty world

And make the ruin common.

Lady Jane Gray, act 4. near the end.

Another species of false sublime, is still more faulty than bombast: and that is, to force elevation by introducing imaginary beings without preserving any propriety in their actions; as if it were lawful to ascribe every extravagance and inconsistency to beings of the poet's creation. No writers are more licentious in that article than Johnson and Dryden:

Metethinks I see Death and the Furies waiting

What we will do, and all the heaven at leisure

For the great spectacle. Draw then your swords:

And if our destiny envy our virtue

The honour of the day, yet let us care

To sell ourselves at such a price, as may

Undo the world to buy us, and make Fate,

While she tempts ours, so fear her own estate.

Cassius, act 5.

——The furious flood on hills

Circling the place, and trembled to see men

Do more than they: whilst Piety left the field,

Grief'd for that side, that in so bad a cause

They knew not what a crime their valour was.

The sun flood fill, and was, behind the cloud

The battle made, seen swelling to drive up

His frighted horse, whom fill the noise drove backward.

Id., act 5.

Ofmyn. While we indulge our common happiness,

He is forgot by whom we all possess,

The brave Almanzor, to whose arms we owe

All that we did, and all that we shall do;

Who like a tempest that outstrips the wind,

Made a just battle ere the bodies join'd.

Abdulla. His victories we scarce could keep in view,

Or publish 'em so fast as he rough drew.

Abimelech. Fate after him below with pain did move,

And Victory could scarce keep pace above.

Death did at length so many slain forget,

And left the tale, and took 'em by the great.

Conquest of Granada, act 2. at beginning.

An actor on the stage may be guilty of bombast as well as an author in his closet: a certain manner of acting, which is grand when supported by dignity in the sentiment and force in the expression, is ridiculous where the sentiment is mean and the expression flat.

GRANGE, a house or farm, not only furnished with necessary places for all manner of husbandry, as stables for horses, stalls for cattle, &c. but where there are granaries and barns for corn, hay-lofts, &c. And by the grant of a grange, such places will pass, without being particularly mentioned.——The word is formed of the Latin *granea* or *granum*, grain, corn, &c. Hence also *granger*, or *grangier*, a grange-keeper or farmer.

GRANICUS, a smaller river near the Hellespont in Lesser Asia, remarkable for the first victory gained by Alexander the Great over the armies of Darius.——Authors disagree very much about the number of the Persians, though all agree that they were vastly more numerous than the Greeks. Justin and Orosius tell us, that the Persian army consisted of 600,000 foot and 20,000 horse; Arrian makes the foot amount to 200,000; but Diodorus tells us, that they were not more than 100,000 foot, and 10,000 horse. The Macedonian army did not exceed 30,000 foot and 5000 horse. The Persian cavalry lined the banks of the Granicus, in order to oppose Alexander wherever he should attempt a passage; and the foot were posted behind the cavalry on an easy ascent. Parmenio would have had Alexander to allow his troops some time to refresh themselves; but he replied, that, after having crossed the Hellespont, it would be a disgrace to him and his troops to be stopped by a rivulet. Accordingly a proper place for crossing the river was no sooner found, than he commanded a strong detachment of horse to enter, he himself following with the right wing which he commanded in person; the trumpets in the mean time sounding, and loud shouts of joy being heard through the whole army. The Persians let fly such showers of arrows against the detachment of Macedonian horse, as caused some confusion; several of their horses being killed or wounded. As they drew near the bank a most bloody engagement ensued; the Macedonians attempting to land, and the Persians pushing them back into the river. Alexander, who observed the confusion they were in, took the command

Grandeur
||
Granicus.

Granicus,
Granite.

mand of them himself; and landing in spite of all opposition, obliged the Persian cavalry, after an obstinate resistance, to give ground. However, Spithrobatas, governor of Ionia, and son-in-law to Darius, still maintained his ground, and did all that lay in his power to bring them back to the charge. Alexander advanced full gallop to engage him; neither did he decline the combat, and both were slightly wounded at the first encounter. Spithrobatas having thrown his javelin without effect, advanced sword in hand to meet his antagonist, who ran him through with his pike as he raised his arm to discharge a blow with his scymitar. But Rosaces, brother to Spithrobatas, at the same time gave Alexander such a furious blow on the head with his battle-ax, that he beat off his plume, and slightly wounded him through the helmet. As he was ready to repeat the blow, Clitus with one stroke of his scymitar cut off Rosaces's head, and thus in all probability saved the life of his sovereign. The Macedonians then, animated by the example of their king, attacked the Persians with new vigour, who soon after betook themselves to flight. Alexander did not pursue them; but immediately charged the enemy's foot with all his forces, who had now passed the river. The Persians, disheartened at the defeat of their cavalry, made no great resistance. The Greek mercenaries retired in good order to a neighbouring hill, whence they sent deputies to Alexander desiring leave to march off unmolested. But he, instead of coming to a parley with them, rushed furiously into the middle of this small body; where his horse was killed under him, and he himself in great danger of being cut in pieces. The Greeks defended themselves with incredible valour for a long time, but were at last almost entirely cut off.—In this battle the Persians are said to have lost 20,000 foot and 2,500 horse, and the Macedonians only 55 foot and 60 horse.

GRANITE, in natural history, a distinct genus of stones, composed of separate and very large concretions rudely compacted together; of great hardness, giving fire with steel, not fermenting with acids, and slowly and imperfectly calcinable in a great fire.

Of this genus there are three species: 1. The hard white granite with black spots, commonly called moor-stone. This is a very valuable kind, consisting of a beautiful congeries of very variously constructed and differently coloured particles, not diffused among or running into one another, but each pure and distinct, though firmly adhering to whichever of the others it comes in contact with, and forming a very firm mass. It is much used in London for the steps of public buildings, and on other occasions where great strength and hardness are required. 2. The hard red granite variegated with black and white, and common in Egypt and Arabia. 3. The pale whitish granite, variegated with black and yellow. This is sometimes found in strata, but more frequently in loose nodules, and is used for paving the streets.

Some of these kinds of stones are found in almost every country, and in many places they are found of immense bigness. The largest mass of this kind in the known world, lying as an unconnected stone, is found near the Cape of Good Hope in Africa, and of which we have the following description in the Phi-

lop. Transact. vol. 68. p. 102, given by Mr Anderson in a letter to Sir John Pringle. "The stone is so remarkable, that it is called by the people here the *Tower of Babel*, and by some the *Pearl Diamond*. It either takes the last name from a place near which it is situated, or it gives name to the tract of cultivated land called the Pearl. It lies upon the top of a ridge of low hills, beyond a large plain, at the distance of about thirty miles from the Cape Town; beyond which, at a little distance, is a range of hills of a much greater height. It is of an oblong shape, and lies north and south. The fourth end is highest; the east and west sides are steep and high; but the top is rounded, and slopes away gradually to the north end, so that you can ascend it by that way, and enjoy a most extensive prospect of the whole country. I could not precisely determine its circumference, but it took us above half an hour to walk round it; and by making every allowance for the rugged way, and stopping a little, I think the most moderate computation must make it exceed half a mile. The same difficulty occurred with respect to knowing its height: but I think, that, at the fourth-end, it is nearly equal to half its length; or, were I to compare it to an object you are acquainted with, I should say it equalled the dome of St Paul's Church.

"I am uncertain whether it ought to be considered as the top of the hill, or a detached stone, because there is no positive proof of either, unless we were to dig about its base; but it would certainly impress every beholder, at first sight, with the idea of its being one stone, not only from its figure, but because it is really one solid uniform mass from top to bottom, without any interruption; which is contrary to the general character of the high hills of this country, they being commonly divided, or composed of different strata, at least if we may judge from the rows of plants or shrubs which grow on the sides of the steepest, and, as I suppose, are produced from the small quantity of earth interposed between them. It has indeed a few fissures, or rather impressions, which do not reach deeper than four or five feet; and near its north end a stratum of a more compact stone runs across, which is not above twelve or fourteen inches thick, with its surface divided into little squares, or oblongs, disposed obliquely. This stratum is perpendicular; but whether it cuts the other to its base, or is superficial, I cannot determine. Its surface is also so smooth, that it does not appear to have formerly been joined to, or separated from, any other part by violence, as is the case with many other large fragments; but enjoys the exact situation where it was originally placed, and has undergone little change from being exposed for so many successive ages to the calcining power of a very hot climate."—A part of this stone being examined by Sir William Hamilton, he determined it to be a granite, and of the same nature with the tops of some of the Alps; and supposes both of them to have been elevated by volcanic explosions.

GRANIVOROUS, an appellation given to animals which feed on corn or seeds. These are principally of the bird kind.

GRANT, in law, a conveyance in writing of such things as cannot pass or be conveyed by word only; such are rents, reversions, services, &c.

GRANT

Granite,
Grant.

GRANT (Francis), Lord Cullen, an eminent lawyer and judge in Scotland, was descended from a younger branch of the family of the Grants of Grant in that kingdom, and was born about the year 1660. When he commenced advocate he made a distinguished figure at the revolution, by opposing the opinion of the old lawyers, who warmly argued on the inability of the convention of estates to make any disposition of the crown. The abilities he shewed in favour of the revolution recommended him to an extensive practice; in which he acquired so much honour, that when the union between the two kingdoms was in agitation, queen Anne unexpectedly, and without application, created him a baronet, with a view of securing his interest in that measure; and upon the same principle, the soon after created him a judge, or one of the lords of session. From this time, according to the custom of Scotland, he was styled, from the name of his estate, Lord Cullen; and the same good qualities that recommended him to this honourable office, were very conspicuous in the discharge of it; which he continued for 20 years with the highest reputation, when a period was put to his life by an illness which lasted but three days. He expired without any agony on March 16th 1726.

His character is drawn to great advantage in the *Biographia Britannica*; where it is observed, among other remarks to his honour, "That as an advocate he was indefatigable in the management of business; but at the same time that he spared no pains, he would use no craft. He had so high an idea of the dignity of his profession, that he held it equally criminal to neglect any honest means of coming at justice, or to make use of any arts to elude it.

"In respect to fortune, though he was modest and frugal, and had a large practice, yet he was far from being avaricious. His private charities were very considerable, and grew in the same proportion with his profits. He was, besides, very scrupulous in many points; he would not suffer a just cause to be lost through a client's want of money. He was such an enemy to oppression, that he never denied his assistance to such as laboured under it; and with respect to the clergy of all professions (in Scotland) his conscience obliged him to serve them without a fee. He saw their wrongs required assistance, and he knew their circumstances would not admit of expence. His additions, therefore, to his paternal estate were much inferior to what might have been expected, and a large accession of character was the principal produce of that activity and diligence by which he was distinguished at the bar.

"When his merit had raised him to the bench, he thought himself accountable to God and man for his conduct in that high office; and that deep sense of his duty, at the same time that it kept him strictly to it, encouraged and supported him in the performance. The pleadings in Scotland are carried on chiefly in writing, which renders them sometimes very prolix, so as to take up much of a judge's time, and to exercise alike his parts and his patience in going through and making himself master of them. In this the diligence and dexterity of lord Cullen were equally conspicuous: he went through every thing that came into his hands very carefully, and sifted it thoroughly; so that the lawyers at the bar never found themselves too strong

for the bench, but on the contrary were often told many things by his lordship, which had either escaped their notice, or which the interest of their client had engaged them to conceal. As his attention to the pleadings guided him to the real merits of the cause; so when he was once master of these, his second care was to dispatch it. He knew, that, in judicature, the next fault to denying, was delaying justice; by which families are always injured, and too often ruined. Whenever, therefore, he had provided against being mistaken, he was desirous of bringing the matter to a short decision; and as he was very solicitous about the former, so the parties themselves helped him not a little as to the latter. Whenever he sat as lord ordinary; the paper of causes was remarkably full, for his reputation being equally established for knowledge and integrity, there were none, who had a good opinion of their own pretensions, but were desirous of bringing them before him, and not many who did not fit down satisfied with his decision. This prevailed more especially after it was found that few of his sentences were reversed; and when they were, it was commonly owing to himself: for if, upon mature reflection, or upon new reasons offered at the re-hearing, he saw any just ground for altering his judgment, he made no scruple of declaring it; being persuaded, that it was more manly, as well as more just, to follow truth, than to support opinion; and his conduct in this respect had a right effect; for instead of lessening, it raised his reputation.

"He would not, however, with all this great stock of knowledge, experience, and probity, trust himself in matters of blood, or venture to decide in criminal cases on the lives of his fellow-creatures; which was the reason, that, though often solicited, he could never be prevailed upon to accept of a seat in the judicial court.

"He was so true a lover of learning, and was so much addicted to his studies, that, notwithstanding the multiplicity of his business while at the bar, and his great attention to his charge when a judge, he nevertheless found time to write various treatises, on very different and important subjects: Some political, which were remarkably well-timed, and highly serviceable to the government: others of a most extensive nature, such as his essays on law, religion, and education, which were dedicated to his present majesty when prince of Wales; by whose command, his then secretary, Mr. Samuel Molyneux, wrote him a letter of thanks, in which were many gracious expressions, as well in relation to the piece, as to its author. He composed, besides these, many discourses on literary subjects, for the exercise of his own thoughts, and for the better discovery of truth; which went no farther than his own closet, and from a principle of modesty were not communicated even to his most intimate friends.

"In his lordship's private character he was as amiable as he was respectable in his public. There were certain circumstances that determined him to part with an estate that was left him by his father; and it being foreseen that he would employ the produce of it, and the money he had acquired by his profession, in a new purchase, there were many decayed families who solicited him to take their lands upon his own terms, relying
entirely

Grant.
Granville.

entirely on that equity, which they conceived to be the rule of his actions. It appeared that their opinion of him was perfectly well grounded. For being at length prevailed upon to lay out his money on the estate of an unfortunate family, who had a debt upon it of more than it was worth; he first put their affairs into order, and by classing the different demands, and compromising a variety of claims, secured some thousand pounds to the heirs, without prejudice to any, and of which they had never been possessed but from his interposition and vigilance in their behalf: So far was he either from making any advantage to himself of their necessities, or of his own skill in his profession; a circumstance justly mentioned to his honour, and which is an equal proof of his candor, generosity, and compassion. He was charitable without ostentation, disinterested in his friendships, and beneficent to all who had any thing to do with him. He was not only strictly just; but so free from any species of avarice, that his lady, who was a woman of great prudence and discretion, finding him more intent on the business committed to him by others, than on his own, took upon herself the care of placing out his money; and to prevent his postponing, as he was apt to do, such kind of affairs, when securities offered, she caused the circumstances of them to be stated in the form of cases, and so procured his opinion upon his own concerns, as if they had been those of a client. These little circumstances are mentioned as more expressive of his temper, than actions of another kind could be; because, in matters of importance, men either act from habit, or from motives that the world cannot penetrate; but, in things of a trivial nature, are less upon their guard, shew their true disposition, and stand confessed for what they are."

GRANVILLE (George), lord Lansdowne, was descended from a very ancient family, derived from Rollo the first duke of Normandy. At eleven years of age he was sent to Trinity College in Cambridge, where he remained five years: but at the age of 13 was admitted to the degree of master of arts; having, before he was 12, spoken a copy of verses of his own composition to the duchess of York at his college, when she paid a visit to the University of Cambridge. In 1696, his comedy called the *She-galants* was acted at the theatre-royal in Lincoln's-inn-fields, as his tragedy called *Herbic Love* was in the year 1698. In 1702 he translated into English the *second Olynthian of Demosthenes*. He was member for the county of Cornwall in the parliament which met in 1710; was afterwards secretary of war, comptroller of the household, then treasurer, and sworn one of the privy-council. The year following, he was created baron Lansdowne. On the accession of king George I. in 1714, he was removed from his treasurer's place; and the next year entered his protest against the bills for attainting lord Bolingbroke and the duke of Ormond. He entered deeply into the scheme for raising an insurrection in the west of England; and being seized as a suspected person, was committed to the tower, where he continued two years. In 1719, he made a speech in the house of Lords, against the bill to prevent occasional conformity. In 1722, he withdrew to France, and continued abroad almost ten years. At his return in 1732, he published a fine

edition of his works in 2 vols quarto. He died in 1735, leaving no male issue.

GRANVILLE, a sea-port town of France, in Lower Normandy, partly seated on a rock and partly on a plain. It gives a title to an English earl. W. Long. 1. 32. N. Lat. 48. 58.

GRANULATED, something that has undergone granulation. See the next article.

GRANULATION, in chemistry, an operation by which metallic substances are reduced into small grains, or roundish particles; the use of which is, to facilitate their combination with other substances. This operation is very simple; it consists only in pouring a melted metal slowly into a vessel filled with water, which is in the mean time to be agitated with a broom. With melted copper, however, which is apt to explode with great violence on the contact of water, some precautions are to be observed, of which an account is given under the article CHEMISTRY, n^o 406. Lead or tin may be granulated by pouring them when melted into a box, the internal surface of which is to be rubbed with powdered chalk, and the box strongly shaken till the lead has become solid. Metals are granulated, because their ductility renders them incapable of being pounded, and because filing is long and tedious, and might render the metal impure by an admixture of iron from the file.

GRAPE, the fruit of the vine. See VINE.

GRAPE-Shot, in artillery, is a combination of small shot put into a thick canvas bag, and corded strongly together, so as to form a kind of cylinder, whose diameter is equal to that of the ball which is adapted to the cannon.

To form grape-shot, a bag of coarse cloth is made just to hold the bottom which is put into it, then as many shot as the grape is to contain; and with a strong pack-thread they are quilted, to keep the shot from moving; and when finished they are put into boxes for carriage, to be transported wherever it is necessary.

—The number of shot in a grape varies according to the service or size of the guns. In sea-service the number is always nine; but by land it is increased to any number or size, from an ounce and a quarter in weight. It has not yet been determined with any accuracy, what number or size best answers in practice; for they often scatter so much, that only a small number take place.

Proper charges for grape-shot have never yet been effectually determined. From some experiments, however, it appears, that for heavy six-pounders one third of the weight of the shot appears to be the best charge of powder; for the light six-pounders, one fourth of the weight of the shot; and, for howitzers, one eighth or one tenth answers very well.

This kind of fire seems yet not to have been enough respected or depended on. However, if cannon and howitzers can be made to throw one third or one fourth of their charge into a space of 39×12 feet, at 200 and 300 yards distance, and those fired ten or twelve times in a minute, it surely forms the thickest fire that can be produced from the same space.

GRAPHOMETER, a mathematical instrument, otherwise called a *Semicircle*; the use of which is to observe any angle whose vertex is at the centre of the instrument in any plane, though it is most commonly hori-

Granville
Graphometer.

Grappling, horizontal, or nearly so), and to find how many degrees it contains. See GEOMETRY, p. [12.]

GRAPPLING, a sort of small anchor, fitted with four or five flukes or claws, and commonly used to ride a boat or other small vessel.

Fire-GRAPPLING, an instrument nearly resembling the former, but differing in the construction of its flukes, which are furnished with strong barbs on their points. These machines are usually fixed on the yard-arms of a ship, in order to grapple any adversary whom the intends to board. They are, however, more particularly useful in *fire-ships* for the purposes described in that article.

GRASS, in botany, &c. a name given to several distinct plants; as the agrostis or couch-grass, the briza or quaking-grass, &c. Under the term *grafs* also are comprehended all manner of herbaceous plants serving for the food of cattle, as clover, rye-grass, &c. See AGRICULTURE, and GRAMINA.

Grass-Sowing. See AGRICULTURE, n° 51—57. and 133—137.

Grass-Walks are made, for the most part, not by sowing grass-seed, but by laying turfs: and indeed the turfs from a fine common or down are much preferable to sown grass: but if walks or plats are to be made by sowing, the best way is to procure the seed from those pastures where the grass is naturally fine and clear; or else the trouble of keeping it from spiry or benty grass will be very great, and it will scarce ever look handsome.

In order to sow grass-walks, the ground must be first dug; and when it has been dressed and laid even, it must be very carefully raked over, and all the clods and stones taken off, and then covered over an inch thick with good mould.

This being done, the seed is to be sown pretty thick, that it may come up close and short; it must then be raked over again, to cover the seed, that if the weather should happen to be windy, it may not be blown away. It ought also to be observed, that where grass is sown in gardens, either for lawns or walks, there should always be a good quantity of the white trefoil or dutch clover sown with it; for this will make a fine turf much sooner than any other sown grass, and will continue a better verdure than any other of the grass-tribe.

In order to keep grass-plats or walks handsome, and in good order, you may sow in autumn fresh seed over any places that are not well filled, or where the grass is dead: but nothing improves grass so much as mowing and constant rolling.

When turf is laid in gardens, it is a generally practice to cover the surface of the ground under the turf, either with sand or very poor earth: the design of this is to keep the grass fine, by preventing its growing too rank. This is proper enough for very rich ground: but it is not so for such land as is middling, or but poor; for when this is practised in such places, the grass will soon wear out and decay in patches.

When turf is taken from a common or down, such ought to be chosen as is free from weeds: and when it is designed to remain for years without renewing, a dressing should be laid upon it every other year, either of very rotten dung, ashes, or, where it can be easily procured, very rotten tan; but these dressings

should be laid on early in the winter, that the rain may wash them into the ground, otherwise they will occasion the grass to burn, when the warmth of the the summer begins.

When grass is so dressed, and well rolled and mowed, it may be kept very beautiful for many years; but where it is not dressed, or fed with sheep, it will rarely continue handsome more than eight or ten years.

GRASSHOPPER, in zoology, a species of GRYLLUS. This insect breeds in such plenty in our meadows, that it is known to every body. It is of the colour of green leaves, except a line of brown which streaks the back, and two pale lines under the belly and behind the legs. It may be divided into the head, the corslet, and the belly. The head is oblong, regarding the earth, and bearing some resemblance to that of a horse. Its mouth is covered by a kind of round buckler, jutting over it, and armed with teeth of a brown colour, hooked at the points. Within the mouth is perceivable a large reddish tongue, and fixed to the upper jaw. The antennæ are very long, tapering off to a point; and the eyes are like two black specks, a little prominent. The corslet is elevated, narrow, armed above and below by two serrated spines. The back is armed with a strong buckler, to which the muscles of the legs are firmly bound; and round these muscles are seen the vessels by which the animal breathes, as white as snow. The last pair of legs are much longer and stronger than the first two pair; fortified by thick muscles, and well formed for leaping. It has four wings; the anterior ones springing from the second pair of legs, the posterior from the third pair. The hinder wings are much finer and more expansive than the foremost, and are the principal instruments of its flight. The belly is considerably large, composed of eight rings, and terminated by a forky tail, covered with down, like the tail of a rat. When examined internally, besides the gullet, we discover a small stomach; and behind that, a very large one, wrinkled and furrowed within-side. Lower down, there is still a third: so that it is thought, and with some probability, that all the animals of this order chew the cud; as they so much resemble ruminant animals in their internal conformation.

A short time after the grasshopper assumes its wings, it fills the meadows with its noise; which, like that among birds, is a call to courtship. The male only of this tribe is vocal; and, upon examining at the base of the wings, there will be found a little hole in its body, covered with a fine transparent membrane. This is thought, by Linnæus, to be the instrument it employs in singing; but others are of opinion the sound is produced by rubbing its hinder legs against each other. But, however this may be, the note of one male is seldom heard, without being returned by another; and the whole little animals, after many mutual insults of this kind, are seen to meet and fight desperately. The female is generally the reward of the victory; for, after the combat, the victor seizes her with his teeth behind the neck, and thus keeps her for several hours, till the business of fecundation is accomplished. At this time they are so strongly united, that it is almost impossible to separate them, without tearing their bodies asunder. Towards the latter end of autumn,

Grass-hopper.

Grasshopper.

the female prepares to deposit her burthen; and her body is then seen greatly distended with eggs, which she carries to the number of 150. In order to make a proper lodgment in the earth for them, nature has furnished her with an instrument in her tail, somewhat resembling a two-edged sword, which she can sheath and unsheath at pleasure: with this she pierces the earth as deep as she is able; and into the hole which the instrument has made, she deposits her eggs one after the other.

Having thus provided for the continuation of her posterity, the animal herself does not long survive; but, as winter approaches, she dries up, seems to feel the effect of age, and dies from a total decay. Some, however, assert that she is killed by the cold; others, that she is eaten by worms; but certain it is, that neither male nor female are ever seen to survive the winter. In the mean time, the eggs which have been deposited, continue unaltered either by the severity of the season, or the retardation of the spring. They are of an oval figure, white, and of the consistence of horn: their size nearly equals that of a grain of anise: they are enveloped in the body within a covering branched all over with veins and arteries; and when excluded, they crack on being pressed between the fingers. Their substance within, is a whitish, viscous, and transparent fluid. In this manner they remain deposited within the surface of the earth during the whole winter, till the return of spring begins to hatch them. About the beginning of May, each egg produces an insect about the bigness of a flea. These are at first of a whitish colour; at the end of two or three days they turn black, and soon after they become of a reddish brown. They appear from the beginning like grasshoppers wanting wings, and hop among the grass, as soon as excluded, with great agility. Yet still they are by no means arrived at their full state of perfection; although they bear a strong resemblance to the animal in its perfect form. They want, or seem to want, the wings which they at last assume; and can only hop among the grass, without being able to fly. The wings, however, are not wanting, but are concealed within four little bunches that seem to deform the sides of the animal. There they lie rolled up in a most curious manner, and occupying a smaller space than one could conceive who saw them extended. These wings, however, it has never been destitute of; though they remain folded up for 20 days, so that they cannot be seen. When it is to undergo this change, the animal ceases from its grassy food, and seeks about for a convenient place beneath some thorn or thistle that may protect it from an accidental shower. It swells up its head and neck, and then draws them in again; and thus alternately for some time it endeavours to get free. At length, the skin covering the head and breast divides above the neck, and the head issues forth. The other parts follow successively; so that the little animal, with its long feelers, legs, &c. works its way from the old skin, which remains fixed to the thistle or thorn. It is indeed inconceivable how the insect can extricate itself from such an exact sheath as that which covered every part of its body.

The grasshopper, thus disengaged from its outer skin, appears in its perfect form; but is then so feeble,

and its body so soft and tender, that it may be moulded like wax. It is no longer of the obscure colour it had before; but is of a greenish white, which becomes more vivid, as the moisture on the surface is dried away. Still, however, the animal continues to shew no signs of life; but appears quite spent and fatigued with its labour for more than an hour together. During this time the body is drying, and the wings unfolding to their greatest expansion; and the curious observer will perceive them, fold after fold, opening to the sun, till at last they become longer than the two hinder legs. The insect's body also is lengthened during this operation, and it becomes much more beautiful than before.

These insects are generally vocal in the midst of summer; and they are heard at sunsetting much louder than during the heats of the day. They are fed upon grass; and if their belly be pressed, they will be seen to return to the juices of the plants they have last fed upon. Though unwilling to fly, and slow of flight, particularly when the weather is moist or cool, they are sometimes seen to fly to considerable distances. If they are caught by one of the hinder legs, they quickly disengage themselves from it, and leave the leg behind them. This, however, doth not grow again, as with crabs and spiders; for as they are animals of but a single year's continuance, they have not sufficient time for repairing these misfortunes. The loss of their leg also prevents them from flying; for being unable to lift themselves in the air, they have not room upon the ground for the proper expansion of their wings. If they be handled roughly, they will bite very fiercely; and, when they fly, they make a noise with their wings. They generally keep in the plain, where the grass is luxuriant, and the ground rich and fertile: there they deposit their eggs, particularly in those cracks which are formed by the heat of the sun.

These animals are sometimes very mischievous, by reason of their great numbers. Some time ago they appeared in Languedoc, and other places of France, in very formidable swarms, and eat up all the harvest of several years. They took their flight like birds, were about an inch long, of a grey colour, and exactly shaped like the common sort. They were found in many places covering the whole surface of the earth, four or five inches deep, and used to lie quiet towards noon; but when the sun then shone warmly upon them, they used to arise and take wing, and, setting on the corn-fields, they would in a few hours eat up the whole produce, ears, leaves, and even the more tender parts of the stalks.—When they had destroyed one field in this manner, they used to take wing and fly to another. They usually flew very high in the air, and directly against the wind; but as soon as they saw a new crop of corn, they dropped together in a swarm, and cleared it as they had done the first. This practice they continued the whole day; and towards evening they settled upon the ground, where they remained quiet till the heat of the following day raised them again. When they had destroyed all the corn in the country, they seized upon the vines, garden-herbs, and willows, and at last upon the hemp. Whole fields of this last they eat up, notwithstanding its great bitterness. Towards autumn,

they

Grasshopper.

Gratarolas
Gratian.

they left off feeding, and were then found in copulation; and soon after this, the females were every where seen laying their eggs, which they deposited in the ground, making a hole with their tail, large enough to receive a goose-quill.

In these holes every female would lay 40 or 50 eggs, each of the size of a millet-seed; and when they had finished the laying, they covered up the hole to keep out the water. After this they died apace; and the multitude of their carcases stunk intolerably, poisoning the air. The next year they hatched in April: and from this one swarm such prodigious numbers were hatched, that 15 tuns of them were destroyed while no bigger than flies, and nine tuns of their eggs before the hatching; and yet there remained enough of them to destroy, in a great measure, the succeeding harvest. After this, they gradually decreased for several years, till they were not more numerous than elsewhere. This was attributed to the industry of the farmers in killing them; but it is more probable that unfavourable seasons destroyed them.

GRATAROLUS (William), a learned physician in the 16th century, was born at Bergamo in Italy; and taught physic with reputation at Padua: but having embraced the Protestant religion, he retired to Switzerland, where he was made professor of physic. He died at Basil in 1568, aged 52. He wrote several curious works in Latin; amongst which are, 1. The manner of preserving and improving the memory. 2. Of preserving in health travellers, men of letters, magistrates, and studious persons, &c.

GRATES for FIRES, are composed of ribs of iron, placed at small distances from one another, so that the air may have sufficient access to the fuel, and the accumulation of the ashes, which would choke the fire, may be prevented.—Grates seem peculiarly adapted to the use of pit-coal, which requires a greater quantity of air to make it burn freely than other kinds of fuel. The hearths of the Britons seem to have been fixed in the centre of their halls, as is yet practised in some parts of Scotland, where the fire is nearly in the middle of the house, and the family sit all around it. Their fire place was perhaps nothing more than a large stone, depressed a little below the level of the ground, and thereby adapted to receive the ashes. About a century ago, it was only the floor of the room, with the addition of a back or hob of clay. But it was now changed among the gentlemen for a portable fire-pan, raised upon low supporters, and fitted with a circular grating of bars. Such were in use among the Gauls in the first century, and among the Welsh in the tenth.

GRATIAN, the son of Valentinian I. by his first wife, was declared Augustus by his father at the city of Amiens in 365, and succeeded him in 376; a prince equally extolled for his wit, eloquence, modesty, charity, and zeal against heretics. He associated Theodosius with him in the empire, and advanced the poet Ausonius to the consulate. He made a great slaughter of the Germans at Strasburg *, and hence was surnamed *Alemannicus*. He was the first emperor who refused the title of *Pontifex Maximus*, upon the score of its being a Pagan dignity. He was assassinated by Andragathius in 375, in the 24th year of his age.

GRATIAN, a famous Benedictine monk, in the 12th

century, was born at Chiuffi, and employed near twenty-four years in composing a work, entitled, *Decretum*, or *Concordantia Discordantium Canonum*, because he there endeavoured to reconcile the canons, which seemed contradictory to each other. This work he published in 1151. As he is frequently mistaken, in taking one canon of one council, or one passage of one father, for another, and has often cited false decretals, several authors have endeavoured to correct his faults; and chiefly Anthony Augustine, in his excellent work, entitled, *De emendatione Gratiani*. To the decretals of Gratian, the popes principally owed the great authority they exercised in the thirteenth and following centuries.

GRATIUS, a Latin poet, cotemporary with Ovid, the author of a poem intitled *Cynegeticon*, or the *Manner of hunting with dogs*; the best edition of which is that of Leyden, 12mo, with the learned notes of Janus Ulitius.

GRATIOLA, HEDGE-HYSSOP; a genus of the monogynia order, belonging to the diandria class of plants. There are four species; the most remarkable of which is the officinalis, or common hedge-hyssop. This grows naturally on the Alps and other mountainous parts of Europe. It hath a thick, fleshy, fibrous, creeping root, which propagates very much, when planted in a proper soil and situation. From this arise several upright square stalks, garnished with narrow spear-shaped leaves, placed opposite. The flowers are produced on the side of the stalks at each joint; they are shaped like those of the fox-glove, but are small, and of a pale yellowish colour.—This herb has an emetic and purgative virtue; to answer which intentions, it was formerly used by the common people in England, but was never much prescribed by the physicians, and at last fell totally into disuse. Of late, however, it has been the subject of a dissertation by Dr James Kofczewski of Warsaw, in Poland; who gives some remarkable accounts of its effects in mania and obstinate venereal cases. It was given in powder, or in extract, to the quantity of half a drachm of the first, and a whole drachm of the second, at each dose. From the cases related in his dissertation, the author draws the following conclusions: 1. The gratiola may be given with safety both to male and female patients. 2. In all disorders proceeding from a superabundance of serum in the fluids, it appears to be a most effectual remedy. 3. In consequence of this, it is had recourse to with very great advantage in melancholy and mania arising from that state of the system. 4. It powerfully promotes purging, vomiting, sweat, and urine; and is therefore much superior to any of the usual evacuating medicines, most of which prove only active in promoting one of these discharges at once. 5. The most obstinate cases of gonorrhœa, fluor albus, and venereal ulcers, are cured by the powder.—In some instances it has induced salivation; but whether or not it can always be made to produce that effect, is not as yet altogether certain. 6. The powder of gratiola prepared from the extract, and exhibited with sugar, does not induce vomiting; and, on the contrary, the powder of the root always promotes that evacuation.

GRATZ, a handsome strong town of Germany, and capital of Styria, with a castle seated on a rock,
19 L 2 and

Grave
Gravelines.

and an university. The Jesuits have a college here; and there are a great number of handsome palaces, and a fine arsenal. The castle stands on a very lofty hill, and communicates with the river by means of a deep well. The empress-dowager was obliged to retire hither during the war of 1741 and 1742. It is seated on the river Muer, in E. Lon. 16. 25. N. Lat. 47. 4.

GRAVE, in music, is applied to a sound which is of a low or deep tone.

GRAVE. The names of places ending with this syllable come from the Saxon *graf*, a wood, thicket, den, or cave.

GRAVE, a very strong town of the Netherlands, in Dutch Brabant, seated on the river Maese, beyond which there is a fort. E. Lon. 5. 41. N. Lat. 51. 46.

GRAVEL, in natural history and gardening, a congeries of pebbles, which, mixed with a stiff loam, makes lasting and elegant gravel-walks; an ornament peculiar to our gardens, and which gives them an advantage over those of other nations.

GRAVEL, in medicine. See the Index subjoined to that article.

GRAVEL-Walks. To make these properly, the bottom should be laid with lime-rubbish, large flint-stones, or any other hard matter, for eight or ten inches thick, to keep weeds from growing through, and over this the gravel is to be laid six or eight inches thick. This should be laid rounding up in the middle, by which means the larger stones will run off to the sides, and may be raked away; for the gravel should never be screened before it is laid on. It is a common mistake to lay these walks too round, which not only makes them uneasy to walk upon, but takes off from their apparent breadth. One inch in five feet is a sufficient proportion for the rise in the middle; so that a walk of 20 feet wide should be four inches higher at the middle than at the edges, and so in proportion. As soon as the gravel is laid, it should be raked, and the large stones thrown back again: then the whole should be rolled both lengthwise and crosswise; and the person who draws the roller should wear shoes with flat heels, that he may make no holes; because holes made in a new walk are not easily remedied. The walks should always be rolled three or four times in very hard showers, after which they will bind more firmly than otherwise they could ever be made to do.

Gravel, with some loam among it, binds more firmly than the rarer kinds; and when gravel is naturally very harsh and sharp, it is proper to add a mixture of loam to it. The best gravel for walks is such as abounds with smooth round pebbles, which, being mixed with a little loam, are bound so firmly together, that they are never afterwards injured either by wet or dry weather. These are not so liable to be turned up by the feet in walking, as the more irregularly shaped pebbles, and remain much more firmly in their places after rolling.

GRAVELINES, a very strong sea-port town of the Netherlands in French Flanders, with a castle and harbour. It was ceded to France by the treaty of the Pyrenees, and is seated in a marshy country on the river Aa, near the sea, in E. Lon. 2. 13. N. Lat. 50. 59.

GRAVELLY LAND, or SOIL, that abounding with gravel or sand, which easily admits of heat and moisture; and the more stony such lands are, the more barren they prove.

GRAVENAC, a town of Germany, in the circle of Suabia, and capital of a county of the same name. E. Lon. 8. 15. N. Lat. 48. 22.

GRAVER, in the art of engraving, a tool by which all the lines, scratches, and shades, are cut in copper, &c. See ENGRAVING.

GRAVESANDE (William James), was born of an ancient and honourable family at Delft in Holland, in 1688. He studied the civil law at Leyden, but mathematical learning was his favourite amusement. When he had taken his doctor's degree in 1707, he settled at the Hague, and practised at the bar, in which situation he cultivated an acquaintance with learned men; with a society of whom, he published a periodical review entitled *Le Journal Littéraire*, which was continued without interruption from the year 1713 to the year 1722, when he died. The most considerable of his works are, *A treatise on perspective; An introduction to the Newtonian philosophy, or a treatise on the elements of physics confirmed by experiments; A treatise on the elements of algebra, for the use of young students; and A course of logic and metaphysics*. He had intended to have presented the public with a system of morality, but his death prevented the execution. The ministers of the republic consulted him on all occasions wherein his talents were requisite; and his skill in calculation was often of service to them; as was his address in decyphering, for detecting the secret correspondence of their enemies. As professor of mathematics and astronomy at Leyden, none ever applied the powers of nature with more success, or to more useful purposes.

GRAVESEND, a town of Kent in England, situated on the banks of the Thames. It is a place of great resort, being the common landing-place for seamen and passengers in their journey to London. All outward-bound ships are obliged to come to an anchor here, till they have been visited and examined by the custom-house officers, and here they generally take in provisions. Here is a blockhouse well mounted with cannon, to command the ships and river, directly opposite to Tilbury fort in Essex. Both at Billingsgate and Gravesend a bell is rung for 15 minutes at high water by night and day, to give notice to the tilt-boats and wherries to put off. The town is commonly called the *corporation of Gravesend and Milton*, these two places being united under the government of a mayor, 12 aldermen, 24 common-council, a town-clerk, &c. Here is a very handsome charitable foundation; Mr Henry Pinnock having in 1624 given two dwelling-houses, and a house for a master-weaver, to employ the poor; and a good estate is also settled for the repairs. The town was plundered and burnt by the French and Spaniards in the reign of Richard II. after which the king, at the request of the abbot of St Mary-le-Grace of Tower-hill, to whom he had granted a manor there, called *Parracks*, vested it with the sole privilege of carrying passengers thence by water. Great part of it was destroyed by fire in 1727, together with the church. The latter has since been rebuilt as one of the 50 new churches, and the houses

Gravelly
Gravelend.

are

Gravina
Graunt.

are much handfomer than before. The streets are narrow, but paved with flints. The chief employment of the labouring people is spinning of hemp to make ropes and nets for fishing. The town is also famous for gardening; the best asparagus in the kingdom being produced here.

GRAVINA, a town of Italy, in the kingdom of Naples, and Terra di Bori, with a bishop's see, and the title of a duchy. E. Lon. 17°. N. Lat. 41°.

GRAVINA (John Vincent), an eminent scholar, and illustrious lawyer of Italy, born at Roggiana in 1664. He was professor of the canon law in the college of Sapienzy at Rome; and though many foreign universities made proposals to draw him to them, he never quitted that city, but died there in 1718. His works are both curious and useful; the greatest of them is *De ortu et progressu Juris Civilis*. A collection of his notes was printed in 4to. at Leipzig in 1737, with the notes of Malcovinus.

GRAVINA (Peter), an Italian poet, much esteemed by the great general Gonzalvo, and Prosper Colonna. He wrote, in a pure Roman style, discourses on matters relating to the law and to the belles lettres, as well as poems. He died in 1527.

GRAVITATION, in natural philosophy, is sometimes distinguished from *gravity*. Thus M. Maupertuis takes gravity for that force whereby a body would fall to the earth; but gravitation for the same diminished by the centrifugal force. See NEWTONIAN *Philosophy*.

GRAVITY, or GRAVITATION, (for the words are most commonly used synonymously,) signifies either the force by which bodies are pressed towards the surface of the earth, or the manifest effect of that force; in which last sense the word has the same signification with *weight*, or *heaviness*.

Concerning gravity in the first sense of the word, or that active power by which all bodies are impelled towards the earth, there have been great disputes. Many eminent philosophers, and among the rest Sir Isaac Newton himself, have considered it as the first of all second causes; an incorporeal or spiritual substance, which never can be perceived any other way than by its effects; an universal property of matter, &c. Others have attempted to explain the phenomena of gravitation by the action of a very subtle ethereal fluid; and to this explanation Sir Isaac, in the latter part of his life, seems not to have been averse. He hath even given a conjecture concerning the manner in which this fluid might occasion these phenomena. But for a full account of the discoveries of this great philosopher concerning the laws of gravitation, the conjectures made by him and others concerning its cause, the various objections that have been made to his doctrine, and the state of the dispute at present, see the articles *Newtonian Philosophy*, *ASTRONOMY*, *ATMOSPHERE*, *EARTH*, *ELECTRICITY*, *FIRE*, *LIGHT*, *ATTRACTION*, *REPULSION*, *PLENUM*, *VACUUM*, &c.

Specific Gravity, denotes the weight belonging to an equal bulk of every different substance. Thus the exact weight of a cubic inch of gold, compared with a cubic inch of water, tin, lead, &c. is called its *specific gravity*. See *HYDROSTATICS*.

GRAUNT (John), author of a curious and celebrated book, entitled, *Natural and political observa-*

tions made upon the bills of mortality. He was a haberdasher of small wares; but laid down his trade, and all public employments, on account of his religion. He was educated a Puritan; afterwards professed himself a Socinian; yet, in the latter part of his life, declared himself of the Roman Catholic religion. He was a member of the royal society, and died in 1674.

GRAY, a town of France, in the Franch Compté, and capital of the bailiwick of Amont. It is a trading place, and seated on the river Saone, in E. Lon. 5. 41. N. Lat. 47. 30.

GRAY (Thomas), an admired English poet, was the youngest and only surviving son of a reputable citizen of London, and was born in Cornhill in 1716. He was educated at Eton, where he contracted a friendship with Mr Horace Walpole, and with Mr Richard West son of the third chancellor of Ireland. Mr West and Mr Gray were both intended for the bar; but the former died early in life, and the latter was diverted from that pursuit by an invitation to accompany Mr Walpole in his travels; which he accepted without any determined plan for his future life. During Mr Gray's travels, he wrote a variety of letters to Mr West and to his parents, which are printed with his poems; and when he returned, finding himself in narrow circumstances, yet with a mind indisposed for active employment, he retired to Cambridge, and devoted himself to study. Soon after his return, his friend West died: and the melancholy impressed on him by this event may be traced in his admired "Elegy wrote a country church-yard;" which is thought to have been begun, if not finished, at this time: tho' the conclusion, as it stands at present, is certainly different from what it was in the first manuscript copy.

The first impulse of his sorrow for the death of his friend gave birth to a very tender sonnet in English, on the Petrarchian model; and also to a sublime apostrophe in hexameters, written in the genuine strain of classical majesty, with which he intended to begin one of his books *De Principiis cogitandi*.

From the winter of the year 1742, to the day of his death, his principal residence was at Cambridge: from which he was seldom absent any considerable time, except between the years 1759 and 1762; when, on the opening of the British Museum, he took lodgings in Southampton-row, in order to have recourse to the Harleian and other manuscripts there deposited, from which he made several curious extracts, amounting in all to a tolerably-sized folio, at present in the hands of Mr Walpole.

About the year 1747, Mr Mason, the editor of Mr Gray's poems, was introduced to him. The former had written, a year or two before, some imitations of Milton's juvenile poems, viz. A Monody on the death of Mr Pope, and two pieces, entitled, *Il Bellisoso*, and *Il Pacifico*, on the peace of Aix-la-Chapelle; and the latter revised them, at the request of a friend. This laid the foundation of an intimacy, which continued without interruption to the death of Mr Gray.

About the year 1750, Mr Gray had put his last hand to his celebrated Elegy written in a country church-yard, and had communicated it to his friend Mr Walpole, whose good taste was too much charmed with it to suffer him to withhold the sight of it from his acquaintance. Accordingly it was shown about for some

Gray.

Gray.

some time in manuscript, and received with all the applause it so justly merited.

At last the publisher of one of the magazines having obtained a surreptitious copy of it, Mr Gray wrote to Mr Walpole, desiring that he would put his own manuscript into the hands of Mr. Doddley, and order him to print it immediately. This was the most popular of all our author's publications. It ran through eleven editions in a very short space of time; was finely translated into Latin by Messrs Antly and Roberts; and, in the same year, by Mr Lloyd.

From July 1759, to the year 1762, he generally resided in London, with a view, as we have already observed, of having recourse to the British Museum. In July 1768, his grace the duke of Grafton wrote him a polite letter, informing him, that his majesty had been pleased to offer to him the professorship of Modern History in the university of Cambridge, then vacant by the death of Mr Laurence Brockett. This place was valuable in itself, the salary being 400*l.* a-year; but what rendered it particularly acceptable to Mr Gray was its being given him without any solicitation. He was indeed remarkably disinterested in all his pursuits. Though his income, before this addition, was very small, he never read or wrote with a view of making his labours useful to himself. He may be said to have been one of those few personages in the annals of literature, especially in the poetical class, who are devoid of self-interest, and at the same time attentive to economy; and also was, among mankind in general, one of those very few economists, who possess that talent, untinged with the slightest stain of avarice. When his circumstances were at the lowest, he gave away such sums in private charity, as would have done credit to an ampler purse. But what chiefly deterred him from seeking any advantage by his literary pursuits, was a certain degree of pride, which led him to despise the idea of being thought an author by profession.

However, it is probable, that early in life he had an intention of publishing an edition of Strabo; for his papers contain a great number of notes and geographical disquisitions on that author, particularly with respect to that part of Asia which comprehends Persia and India. The insupportable pains which he took with the writings of Plato, and the quantity of critical as well as explanatory observations which he has left upon almost every part of his works, plainly indicate, that no man in Europe was better prepared to republish and illustrate that philosopher, than Mr Gray. Another work, on which he bestowed uncommon labour, was the *Anthologia*. In an interleaved copy of that collection of Greek epigrams, he has transcribed several additional ones, which he selected in his extensive reading; has inserted a great number of critical notes and emendations, and subjoined a copious index. But, whether he intended this performance for the press or not, is uncertain. The only work, which he meditated upon, with this direct view from the beginning, was a history of English poetry, upon a plan sketched out by Mr Pope. He has mentioned this himself in an advertisement to those three fine imitations of Norse and Welch poetry, which he gave the world in the last edition of his Poems. But, after he had made some considerable preparations for the execution of this design, and Mr Mason had offered him

Gray.

his assistance, he was informed, that Mr Warton, of Trinity College, Oxford, was engaged in a work of the same kind. The undertaking was therefore relinquished, by mutual consent; and, soon after, on that gentleman's desiring a sight of the plan, our author readily sent him a copy of it.

Among other sciences, Mr Gray had acquired a great knowledge of Gothic architecture. He had seen and accurately studied in his youth, while abroad, the Roman proportions on the spot, both in ancient times, and in the works of Palladio. In his later years he applied himself to consider those stupendous structures of more modern date that adorn our own country; which, if they have not the same grace, have undoubtedly equal dignity. He endeavoured to trace this mode of building, from the time it commenced, thro' its various changes, till it arrived at its perfection in the reign of Henry VIII. and ended in that of Elizabeth. For this purpose, he did not so much depend upon written accounts, as that internal evidence which the buildings themselves give of their respective antiquity; since they constantly furnish to the well informed eye, arms, ornaments, and other marks, by which their several ages may be ascertained. On this account he applied himself to the study of heraldry, as a preparatory science; and has left behind him a number of genealogical papers, more than sufficient to prove him a complete master of it. By these means he arrived at so very extraordinary a pitch of sagacity, as to be enabled to pronounce, at first sight, on the precise time when every particular part of any of our cathedrals was erected.

But the favourite study of Mr Gray, for the last ten years of his life, was natural history, which he then rather resumed than began; as, by the instructions of his uncle Antrobus, he was a considerable botanist at fifteen. The marginal notes, which he has left on Linnaeus, and other writers on the vegetable, animal, and fossil kingdoms, are very numerous: but the most considerable are on Hudson's *Flora Anglica*, and the tenth edition of the *Systema Nature*; which latter he interleaved and filled almost entirely. While employed on zoology, he read Aristotle's treatise on that subject with great care, and explained many difficult passages of that obscure ancient by the lights he had received from modern naturalists. In a word, excepting pure mathematics, and the studies dependent on that science, there was hardly any part of human learning, in which he had not acquired a competent skill, and in most of them a consummate mastery.

To this account of his literary character we may add, that he had a fine taste in painting, prints, gardening, and music; and was moreover a man of good-breeding, virtue, and humanity.

He died in 1771; and an edition of his poems, with memoirs of his life and writings, were published in 4to, in 1775, by Mr Mason. This gentleman, however, instead of employing his own pen in drawing Mr Gray's character, has adopted one drawn by the Rev. Mr Temple, rector of Mamhead in Devonshire, in a letter to Mr Boswell; to whom the public are indebted for communicating it.

"Perhaps (says Mr Temple) he was the most learned man in Europe. He was equally acquainted with the elegant and profound parts of science, and that

Gray.
Greaves.

that not superficially but thoroughly. He knew every branch of history, both natural and civil; had read all the original historians of England, France, and Italy; and was a great antiquarian. Criticism, metaphysics, morals, politics, made a principal part of his plan of study; voyages and travels of all sorts were his favourite amusement; and he had a fine taste in painting, prints, architecture, and gardening. With such a fund of knowledge, his conversation must have been equally instructing and entertaining; but he was also a good man, a well-bred man, a man of virtue and humanity. There is no character without some speck, some imperfection; and I think the greatest defect in his was an affectation in delicacy, or rather effeminacy, and a visible fastidiousness, or contempt and disdain of his inferiors in science. He also had, in some degree, that weakness which disgusted Voltaire so much in Mr Congreve: though he seemed to value others chiefly according to the progress they had made in knowledge, yet he could not bear to be considered himself merely as a man of letters; and though without birth, or fortune, or station, his desire was to be looked upon as a private independent gentleman, who read for his amusement. Perhaps it may be said, What signifies so much knowledge, when it produces so little? Is it worth taking so much pains to leave no memorial but a few poems? But let it be considered, that Mr Gray was, to others, at least innocently employed; to himself, certainly beneficially. His time passed agreeably; he was every day making some new acquisition in science; his mind was enlarged, his heart softened, and his virtue strengthened; the world and mankind were shewn to him without a mask; and he was taught to consider every thing as trifling, and unworthy the attention of a wise man, except the pursuit of knowledge, and the practice of virtue in that state wherein God hath placed us."

GRAYLING, in ornithology, a species of SALMO.

In angling for this fish your hook must be armed upon the shanks with a very narrow plate of lead, which should be slenderest at the bent of the hook, that the bait (which is to be a large grasshopper, the uppermost wing of which must be pulled off) may come over to it the more easily. At the point let there be a cad-bait in a continual motion. The jag-tail, which is a worm of a pale flesh-colour, with a yellow tag on its tail, is an excellent bait for the grayling in March and April.

GREASE, a swelling and gourdfiness of the legs of a horse. See FARRIERY, § XXXV.

GREATER TONE, in music. See TONE.

GREAVES (John), an eminent physician and antiquary, was the eldest son of John Greaves rector of Colemore near Alresford in Hampshire, and born in 1602. He was educated at Balliol college in Oxford, from which he removed to Merton. He was afterwards, on the foot of his great merit, chosen geometry professor of Gresham college. His ardent thirst of knowledge soon carried him into several parts of Europe, where he eagerly seized every opportunity of improving it. His next voyage was into the eastern countries; where nothing remarkable in the heavens, earth, or even subterraneous places, seems to have escaped his nice observation. He, with indefatigable

industry, and even at the peril of his life, collected a considerable number of Arabic, Persian, and Greek manuscripts for archbishop Laud. Of these he well knew the value, as he was a master of the languages in which they were written. He also collected for that prelate many oriental gems and coins. He took a more accurate survey of the pyramids than any traveller who went before him. On his return from the East, he visited several parts of Italy a second time. During his stay at Rome, he made a particular inquiry into the true state of the ancient weights and measures. Soon after he had finished his second voyage, he was chosen Savilian professor of astronomy at Oxford. He was eminently qualified for this professorship, as the works of ancient and modern astronomers were familiar to him. His books relating to oriental learning, his *Pyramidographia*, or a description of the pyramids in Egypt, his *Epocha Celestiorum*, and other curious and useful pieces, of which Mr Ward has given us a catalogue, shew him to have been a great man. Those which he intended to publish would have shewn him to be a greater; but he was stopped in his great career by death, in 1652.

GREBE, in ornithology. See COLYMBUS.

GREECE, the present Rumelia, and in many respects one of the most deservedly celebrated countries in the world, was anciently bounded on the north by Macedonia, and the river Strymon; on the west by the Ionian sea; on the south by the Mediterranean; and on the east by the Egean sea and Archipelago. It extended from the Strymon, by which it was parted from Thrace, to the promontory of Tenarus, the southmost point of the Peloponnesus, now the Morea, about 6° 20' of latitude, or nearly 440 English miles, and in breadth from east to west about 359 miles.

The general names by which the inhabitants of this country were known to the ancients, were those of *Graioi*, or *Graioi*, from whence the name of *Greece* is plainly derived. These names are thought come from *Græcus*, the father, or (according to some) the son, of Thessalus, who gave name to Thessaly; but some modern critics chuse to derive it from *Ragus*, the same with *Reu*, the son of Peleg, by the transposition of a letter to soften the sound.—These names were afterwards changed for *Achai* and *Hellenes*; the first, as is supposed, from *Acheus*, the son of Xuthus, the son of Hellen, and father of Ion; or, according to the fable, the son of Jupiter: the other from Hellen, above mentioned, the son of Deucalion, and father of Dorus, from whom came the *Dores*, afterwards a famous nation among the Greeks.—Another name by which the Greeks were known in some parts of the country, was that of *Pelagii*, which the Arcadians, the most ancient people in Greece, deduced from their pretended founder *Pelagius*; who is said to have got such footing in Peloponnesus, that the whole peninsula from him was called *Pelagisia*. But the most ancient name of all is universally allowed to have been that of *Iones*, which the Greeks themselves derived from Ion the son of Xuthus; or, as the fable hath it, of Apollo, by Crenusa the daughter of Erichtheus the grandson of Deucalion. Josephus, however, affirms, that their original is of much older date; and that Javan, the son of Japhet, and grandson of Noah, was the first who peopled these countries; which Bochart hath also rendered

Grebe,
Greece.

Greece.

dered very probable. It is true, indeed, that among the Greeks themselves, only the Athenians, and such colonies as sprung from them, were called *Ionæ*; but it is also plain beyond exception, that other nations gave this name to all the inhabitants of Greece.

The inhabitants of Greece in the first ages, even by the confession of their own historians, appear to have been savages scarce a degree removed from brutes. They lived indifferently on every fruit, herb, or root that came in their way; and lay either in the open fields, or at best sheltered themselves in dens, caves, and hollow trees; the country itself in the mean time remaining one continued uncultivated desert. —The first improvement they made in their way of living, was the exchanging of their old food for the more wholesome acorns, building huts for themselves to sleep in, and covering their bodies with the skins of beasts. For all this, it seems, they were beholden to Pelægius above-mentioned, (supposed by some to be Peleg spoke of in Scripture), and who was highly revered by them on that account. —This reformation in their way of life, however, it seems wrought none in their manners. On the contrary, they who had nothing to fight for but a hole to sleep in, began now to envy and rob one another of these slender acquisitions. This, in process of time, put them under a necessity of joining themselves into companies under some head, that they might either more safely plunder their neighbours, or preserve what they had got. Laws they had none, except that of the sword: so that those only lived in safety who inhabited the most barren and craggy places; and hence Greece for a long time had no settled inhabitants, the weakest being always turned out by the strongest. Their gigantic size and strength, if we may believe Plutarch, added so much to their insolence and cruelty, that they seemed to glory in committing the greatest acts of violence and barbarity on those that unhappily fell into their hands.

The next advance towards civilization, was their forming themselves into regular societies, to cultivate the lands, and build themselves towns and cities for their safety. Their original barbarity and mutual violences against each other naturally prevented them from uniting as one nation, or even into any considerable community; and hence the great number of states into which Greece was originally divided. The most remarkable of these small principalities mentioned in history are the following: — In Peloponnesus were those of Sicyon, Argos, and Messenia, Achaia Propria, Arcadia, and Laconia. In Grecia Propria, (that part of Greece which lay without Peloponnesus), were those of Attica, Megara, Boeotia, Locris, Epichæmidia, Doris, Phocis, Locris, Ozolæ, and Ætolia. In Epirus were the Molossi, Amphiloichi, Cassiopæi, Dræopes, Chaoces, Threpsotii, Almeni, and Acarnani. In Thessaly were those of the Thessaliois, Estiotis, Pelasgiotis, Magnesia, and Phthia. —All these have at one time or other been severally governed by kings of their own, though we only find the names of many of them mentioned in the histories of the more considerable kingdoms of Sparta, Attica, Thebes, &c. —The erection of these kingdoms, however, for some time, did not much alter the case; the inhabitants of the new kingdoms plundered and destroyed one another without mercy. Attica was the only place

Greece.

in any degree free from these incursions, because it was naturally destitute of every thing that could invite a plundering enemy; but those cities fared much worse which were situated in the sea-coasts; because they were in continual danger of being plundered either by sea or land: for pirates at that time did not less infect all those seas, than robbers did the land. And this was one main cause why most of the ancient cities of Greece were situated at some considerable distance from the shore; but even in these, as all their safety consisted in the resistance they could make against an invader, their inhabitants were under a necessity of going constantly armed, and being ever on their guard.

Another mischief arising from these continual piracies and robberies was, that they occasioned the far greater part of the lands to lie uncultivated, so that the people only planted and sowed as much as was barely necessary for their present support; and where there was such an universal neglect of agriculture, there could be as little room for any discoveries in other useful arts and trades. Hence, when other nations, as the Jews, Egyptians, Midianites, Phœnicians, &c. had improved themselves to a very high degree, the Greeks seem to have been utter strangers to every useful art.

During this period of savage barbarity, the most renowned Grecian heroes, as Hercules, Theseus, &c. performed their exploits; which, however exaggerated by poetic fiction, no doubt had a foundation in truth. Some indeed are of opinion that the Grecian heroes are entirely fictitious, and their exploits derived from those of the Hebrew worthies, such as Samson, Gideon, &c. Yet, considering the extreme degree of barbarity which at that time prevailed throughout Greece, it seems not at all improbable that some persons of extraordinary strength and courage might undertake the cause of the oppressed, and travel about like the more modern knights-errant in quest of adventures.

The first expedition in which we find the Greeks united, was that against Troy, the particulars of which are recited under the article *Troy*. Their success here (which happened about 1184 B. C.) cost them very dear; vast numbers of their bravest warriors being slain; great numbers of the survivors being cast away in their return; and many of those who had the good luck to get back again, being soon after murdered, or driven out of their country. It is probable, however, that their having staid for such a long time in Asia, might contribute to civilize the Greeks somewhat sooner than what they otherwise would have been; and accordingly from this time, we find their history somewhat less obscure, and as it were begun to emerge out of darkness. The continual wars, indeed, in which they were engaged among themselves, no doubt, for a long time, prevented them from making any considerable progress in those arts in which they afterwards made so great progress. These wars, which indeed never ceased as long as the Greeks preserved their liberty, rendered them brave, and skilled in the military art, above all other nations; but at the same time they effectually prevented them from making permanent conquests, and confined them within the bounds of their own country; while the different states were one way or other so equally balanced, that scarce

one

Greece.

one of them was able perfectly to subdue another. The Spartans, however, having, with great difficulty, reduced the kingdom of Messene, and added its territories to their own, became the leading people in Greece. Their superiority was long disputed by Athens; but the Peloponnesian war at last determined that point in favour of the Spartans, when the city of Athens was taken, and its walls demolished by Lyfander the Spartan general. See *ATLANTA*, n° 164. —By the battle of Leuctra, the Spartans lost that superiority which they had maintained for 500 years, and which now devolved on the Thebans. After the death of Epaminondas, the celebrated Theban general, however, as no person was found possessed of his abilities, the Thebans were again obliged to yield the superiority to the Spartans. But by this time the Greeks had become acquainted with the luxuries and elegancies of life; and all the rigour of their original laws could not prevent them from valuing these as highly as other people. This did not indeed abate their valour, but it heightened their mutual animosities; at the same time that, for the sake of a more easy and comfortable life, they became more disposed to submit to a master. The Persians, whose power they had long dreaded, and who were unable to resist them by force of arms, at last found out (by the advice of Alcibiades) the proper method of reducing the Grecian power; namely, by assisting them by turns, and supplying one state with money to fight against another, till they should all be so much reduced, that they might become an easy prey. Thus the Greeks were weakened, though the Persians did not reap any benefit from their weakness. Philip of Macedon entered into the same political views; and partly by intrigue, partly by force, got himself declared Generalissimo of Greece. His successor Alexander the Great completed their subjection; and by destroying the city of Thebes, and exterminating its inhabitants, struck such a terror throughout Greece, that he was as fully obeyed by all the states, as by any of the rest of his subjects. During his absence in Persia, however, they attempted to shake off the Macedonian yoke, but were quelled by his general Antipater. The news of Alexander's death was to them a matter of the utmost joy; but their mutual animosities prevented them from joining in any solid plan for the recovery of their liberties, and hence they continued to be oppressed by Alexander's successors, or other tyrants, till Aratus, an Achæan, about 268 B. C. formed a design of setting his country free from these oppressors. He persuaded a number of the small republics to enter into a league for their own defence, which was called the *Achæan league*; and notwithstanding that the republics, taken singly, had very little strength, they not only maintained their independency, but soon became formidable when united. This association continued to become daily more and more powerful; but received a severe check from Cleomenes, king of Sparta, which obliged them to call in Antigonus to their assistance. This prince overcame Cleomenes at the battle of Sellasia, and afterwards made himself master of Sparta. Thus he became a more formidable enemy than the one he had conquered, and the recovery of the Grecian liberties was incomplete.

Soon after this, the Greeks began to feel the weight
Vol. V.

Greece.

of a power more formidable than any which they had yet experienced; namely, that of the Romans. That insidious and haughty republic first intermeddled with the Grecian affairs, under pretence of setting them at liberty from the oppression of Philip of Macedon. This, by a proper union among themselves, they might have accomplished: but in this they acted as though they had been infatuated; receiving with the utmost joy the decree of the Roman consul, who declared them free; without considering, that he who had thus given them liberty, might take it away at his pleasure. This lesson, however, they were soon taught, by the total reduction of their country to a Roman province; yet this can scarce be called a misfortune, when we look back to their history, and consider their outrages upon one another: nor can we sympathize with them for the loss of that liberty which they only made use of to fill their country with slaughter and bloodshed. After their conquest by the Romans, they made no united effort to recover their liberty. They continued in quiet subjection till the beginning of the 15th century. About that time, they began to suffer under the tyranny of the Turks, and their sufferings were completed by the taking of Constantinople in 1453. Since that time, they have groaned under the yoke of a most despotic government; so that all traces of their former valour, ingenuity, and learning, are now in a manner totally extinct.

Modern Greece comprehends Macedonia; Albania, now called Arnaut; Epirus; Thessaly, now Jana; Achaia, now Livadia; the Peloponnesus, now Morea; together with the islands on its coast, and in the Archipelago. The continent of Greece is seated betwixt the 36th and 43d degrees of north latitude; and between the 19th and 27th degrees of longitude, east of London. To the north it is bounded, by Bulgaria and Servia, from which it is divided by a ridge of mountains; to the south, by the Mediterranean sea; to the east, by Romania and the Archipelago; and to the west, by the Adriatic, or gulph of Venice. Its length is said to be about four hundred miles, and its utmost breadth about three hundred and fifty. The air is extremely temperate and healthy; and the soil fruitful, though badly cultivated, yielding corn; wine, delicious fruits, and abounding with cattle, fowls, and venison. As to religion, Christianity was planted in Greece soon after the death of our Saviour, and flourished there for many ages in great purity; but since the Greeks became subject to the Turkish yoke, they have sunk into the most deplorable ignorance, in consequence of the slavery and thraldom under which they groan, and their religion is now greatly corrupted. It is indeed little better than a heap of ridiculous ceremonies and absurdities. The head of the Greek church is the patriarch of Constantinople; who is chosen by the neighbouring archbishops and metropolitans, and confirmed by the emperor or grand vizir. He is a person of great dignity, being the head and director of the eastern church. The other patriarchs are those of Jerusalem, Antioch, and Alexandria, Mr. Tournefort tells us, that the patriarchates are now generally set to sale, and bestowed upon those who are the highest bidders. The patriarchs, metropolitans, archbishops, and bishops, are always chosen from among the Caloyers or Greek monks. Ba-
fore

Greece.

fore the patriarchs receive their patents and the caftan, which is a veft of linley-woolsey, or fome other ftuff, prefented by the grand fignior to ambaffadors and other perfons newly invefted with fome confiderable dignity, they are obliged to make large prefents to the vizir, &c. The income of the patriarch of Conftantinople is faid to amount to no lefs than one hundred and twenty thoufand guilders, of which he pays the one half by way of annual tribute to the Ottoman Porte, adding fix thoufand guilders befides as a prefent at the feaft of Bairam. The next perfon to a bifhop among the clergy is an archimandrite, who is the director of one or more convents, which are called mandren; then come the abbot, the arch-prieft, the prieft, the deacon, the under-deacon, the chanter, and the lecturer. The feccular clergy are fubjected to no rules, and never rife higher than high-prieft. They are allowed to marry once; but it muft be with a virgin, and before they are ordained. They have neither glebe nor tythes, but depend on the perquifites that arife from their office; and they feldom preach but in Lent. The Greeks have few nunneries; but a great many convents of monks, who are all priefts, and, ftudents excepted, obliged to follow fome handicraft employment, and lead a very auftere life. The Greeks deny the fupremacy of the pope, and abhor the worfhip of images; but have a multitude of pictures of faints in their churches, whom they pray to as mediators. Their fafts are very fevere. They believe alfo in the doctrine of tranfubftantiation, and that the Holy Ghoft does not proceed from the Son. They admit not of purgatory, fays Mr. Thevenot: but yet they allow a third place, where they fay the bleffed remain, in expectation of the day of judgment. At mafs they confecrate with leavened bread; and communicate under both kinds, as well laics as priefts, and as well women and children as men. When they carry the facrament to the fick, they do not proftitate themfelves before it, nor expose it to be adored: neither do they carry it in proceffion, or have any particular feaft in honour of it. Baptifm is performed among them by plunging the whole body of the child thrice into water. Immediately after baptifm, they give it confirmation and the communion; and feven days after that, it undergoes the ceremony of abfolution. When a prieft is married, among other ceremonies, the bridegroom and bride drink each two glaffes of wine; then the glafs is given to the prieft, who merrily drinks off the reft of the wine, and breaking the glafs, fays, So may the bridegroom break the virginity of the bride. As to the character of the modern Greeks, they are faid to be very covetous, hypocritical, treacherous, great pederaffs, and at the fame time revengeful to the higheft degree; but very fuperftitious. They are fo much defpifed by the Turks, that thefe do not value even a Greek who turns Mahometan. The Turks are remarkable for their taciturnity; they never ufe any unneceffary words: but the Greeks, on the contrary, are very talkative and lively. The Turks generally praftife what their religion enjoins, but the Greeks do not; and their mifery puts them upon a thoufand mean shifts and fcandalous praftices, authorized by bad example, and perpetuated from father to fon. The Greek women have fine features and beautiful complexions: their

countenances ftill very much refemble thofe of the ancient Greek ftatues.

GREEK, or GRECIAN, any thing belonging to ancient Greece.

The Greek language, as preferved in the writings of the celebrated authors of antiquity, as Homer, Hefiod, Demofthenes, Aristotle, Plato, Xenophon, &c. has a great variety of terms and expreffions, fuitable to the genius and occafions of a polite and learned people, who had a tafte for arts and fciences. In it, proper names are fignificative; which is the reafon that the modern languages borrow fo many terms from it. When any new invention, inftrument, machine, or the like, is difcovered, recourfe is generally had to the Greek for a name to it; the facility wherewith words are there compounded, affording fuch as will be expreffive of its ufe: fuch are, barometer, hygrometer, microfcope, telescope, thermometer, &c. But of all fciences, medicine moft abounds with fuch terms; as diaphoretic, diagnosis, diarrhoea, hæmorrhage, hydrophobia, phthifis, atrophy, &c. Befides the copioufnefs and fignificancy of the Greek, wherein it excels moft, if not all, other languages, it has alfo three numbers, *viz.* a fingular, dual, and plural: alfo abundance of tenfes in its verbs, which makes a variety in difcourfe, prevents a certain drynefs that always accompanies too great a uniformity, and renders that language peculiarly proper for all kinds of verfe. The ufe of the participles, of the aorift and preterite, together with the compound words already mentioned, give it a peculiar force and brevity without taking any thing from their perfpicuity.

It is no eafy matter to affign the precise difference between the modern and ancient Greek; which confifts in the terminations of the nouns, pronouns, verbs, &c. not unlike what obtains between fome of the dialects of the Italian or Spanifh. There are alfo in the modern Greek many new words, not to be met with in the ancient. We may therefore diftinguifh three ages of the Greek tongue: the firft of which ends at the time when Conftantinople became the capital of the Roman empire; the fecond lafted from that period to the taking of Conftantinople by the Turks; and the third, from that time to this.

GREEK Bible. See BIBLE.

GREEK Church. See GREECE.

GREEK Monks and Nuns, of whatever order, confider St. Bafil as their founder and common father, and efteem it the higheft crime to deviate in the leaft from his conftitutions. There are feveral beautiful convents with churches, in which the monks perform divine fervice day and night. Some of the monks are cœnobites, or live together, wear the fame habit, eat at the fame table, and perform the fame exercifes and employments.

GREEN, one of the original prismatic colours, exhibited by the refraction of the rays of light. See OPTICS.

GREEN, among painters. See COLOUR-Making, n° 26.

GREEN Cloth, a board or court of juftice held in the compting-house of the kings houfehold, compofed of the Lord Steward and officers under him, who fit daily. To this court is committed the charge and oversight of the king's houfehold in matters of juftice

Greek,
Green.

Green,
Greenland.

justice and government, with a power to correct all offenders, and to maintain the peace of the verge, or jurisdiction of the court-royal; which is every way about 200 yards from the last gate of the palace where his majesty resides.

It takes its name, *board of green cloth*, from a green cloth spread over the board where they sit.

Without a warrant first obtained from this court, none of the king's servants can be arrested for debt.

Clerks of the GREEN Cloth are two officers of the board of green cloth, who appoint the diet of the king and his household; and keep all records, ledgers, and papers relating thereto; made up bills, parcels, and debentures for salaries, and provisions and necessaries for the officers of the buttery, pantry, cellar, &c.

They also wait upon foreign princes when entertained by his majesty.

GREEN-Finch in ornithology, the English name of the greenish fringilla, with the wings and tail variegated with yellow. See FRINGILLA.

GREEN-House, or *Conservatory*, a house in a garden, contrived for sheltering and preserving the most curious and tender exotic plants, which in our climate will not bear to be exposed to the open air, especially during the winter season. These are generally large and beautiful structures, equally ornamental and useful.

GREEN-Silver, the name of an ancient custom within the manor of Writtel in the county of Essex in England; which is, that every tenant whose fore-door opens to Greenbury, shall pay an half-penny yearly to the lord, by the name of *green-silver*.

GREEN Wax, is used where estates are delivered to the sheriffs out of the exchequer, under the seal of that court, made in green wax, to be levied in the several counties. This word is mentioned the 43d stat. Ed. III. c. 9. and 7 Hen. IV. c. 4.

GREENLAND, a general name by which are denoted the most easterly parts of America, stretching towards the north pole, and likewise some islands to the northward of the continent of Europe, lying in very high latitudes.

This country is divided into West and East Greenland.—West Greenland is now determined by our latest maps to be a part of the continent of America, though upon what authority is not very clear. That part of it which the Europeans have any knowledge of is bounded on the west by Baffin's bay, on the south by Davis's straits, and on the east by the northern part of the Atlantic Ocean. It is a very mountainous country, and some parts of it so high that they may be discerned thirty leagues off at sea. The inland mountains, hills, and rocks, are covered with perpetual snow; but the low lands on the sea-side are clothed with verdure in the summer season. The coast abounds with inlets, bays, and large rivers; and is surrounded with a vast number of islands of different dimensions. In a great many places however, on the eastern coast especially, the shore is inaccessible by reason of the floating mountains of ice. The principal river, called *Baal*, falls into the sea in the 64th degree of latitude, where the first Danish lodge was built in 1721; and has been navigated above 40 miles up the country.

West Greenland was first peopled by Europeans in

the eighth century. At that time a company of Greenlanders, headed by one Ericke Rande, were by accident driven on the coast. On his return he represented the country in such a favourable light, that some families again followed him thither, where they soon became a thriving colony, and bestowed on their new habitation the name of *Greenland*, or *Greenland*, on account of its verdant appearance. This colony was converted to Christianity by a missionary from Norway, sent thither by the celebrated Olaf, the first Norwegian monarch who embraced the true religion. The Greenland settlement continued to increase and thrive under his protection; and, in a little time, the country was provided with many towns, churches, convents, bishops, &c. under the jurisdiction of the archbishop of Drontheim. A considerable commerce was carried on between Greenland and Norway; and a regular intercourse maintained between the two countries till the year 1406, when the last bishop was sent over. From that time all correspondence was cut off, and all knowledge of Greenland has been buried in oblivion.

This strange and abrupt cessation of all trade and intercourse has been attributed to various causes; but the most probable is the following. The colony, from its first settlement, had been harassed by the natives, a barbarous and savage people, agreeing in customs, garb, and appearance, with the Esquimaux found about Hudson's Bay. This nation, called *Schrellings*, at length prevailed against the Iceland settlers who inhabited the western district, and exterminated them in the 14th century; inasmuch, that when their brethren of the eastern district came to their assistance, they found nothing alive but some cattle and flocks of sheep running wild about the country. Perhaps they themselves afterwards experienced the same fate, and were totally destroyed by these Schrellings, whose descendants still inhabit the western parts of Greenland, and from tradition confirm this conjecture. They affirm that the houses and villages whose ruins still appear, were inhabited by a nation of strangers, whom their ancestors destroyed. There are reasons, however, for believing that there may be still some descendants of the ancient Iceland colony remaining in the eastern district, though they cannot be visited by land, on account of the stupendous mountains, perpetually covered with snow, which divide the two parts of Greenland; while they have been rendered inaccessible by sea, by the vast quantity of ice driven from Spitzbergen, or East Greenland. One would imagine that there must have been some considerable alteration in the northern parts of the world since the 15th century, so that the coast of Greenland is now become almost totally inaccessible, though formerly visited with very little difficulty. It is also natural to ask, By what means the people of the eastern colony surmounted the above-mentioned obstacles when they went to the assistance of their western friends, how they returned to their own country, and in what manner historians learned the success of their expedition? Concerning all this we have very little satisfactory information. All that can be learned from the most authentic records is, that Greenland was divided into two districts, called *West Bygd*, and *East Bygd*: that the western division contained four parishes, and 100 villages: that

Peopled by a colony from Iceland.

All correspondence with it suddenly cut

Colony supposed to be exterminated.

Account of the colony.

Greenland.

6
Attempts to redi-
ver the
country.

the eastern district was still more flourishing, as being nearer to Iceland, sooner settled, and more frequented by shipping from Norway. There are also many accounts, though most of them romantic and slightly attested, which render it probable that part of the eastern colony still subsists, who, at some time or other, may have given the imperfect relation above-mentioned. This colony, in ancient times, certainly comprehended twelve extensive parishes, one hundred and ninety villages, a bishop's see, and two monasteries. The present inhabitants of the western district are entirely ignorant of this part, from which they are divided by rocks, mountains, and deserts, and still more effectually by their apprehension : for they believe the eastern Greenlanders to be a cruel, barbarous nation, that destroy and eat all strangers who fall into their hands. About a century after all intercourse between Norway and Greenland had ceased, several ships were sent successively by the kings of Denmark, in order to discover the eastern district ; but all of them miscarried. Among these adventurers, Mogens Heinsön, after having surmounted many difficulties and dangers, got sight of the land, which, however, he could not approach. At his return, he pretended that the ship was arrested in the middle of her course, by certain rocks of loadstone at the bottom of the sea. The same year, 1576, in which this attempt was made, has been rendered remarkable by the voyage of Captain Martin Frobisher, sent upon the same errand by Queen Elizabeth. He likewise desired the land ; but could not reach it, and therefore returned to England ; yet not before he had sailed sixty leagues in the strait which still retains his name, and landed on several islands, where he had some communication with the natives. He had likewise taken possession of the country in the name of Queen Elizabeth ; and brought away some pieces of heavy black stone, from which the refiners of London extracted a certain proportion of gold. In the ensuing spring, he undertook a second voyage, at the head of a small squadron, equipped at the expense of the public ; entered the straits a second time ; discovered upon an island a gold and silver mine ; bestowed names upon different bays, islands, and headlands ; and brought away a lading of ore, together with two natives, a male and a female, whom the English kidnapped.

Such was the success of this voyage, that another armament was fitted out under the auspices of Admiral Frobisher, consisting of fifteen sail, including a considerable number of soldiers, miners, smelters, carpenters, and bakers, to remain all the winter near the mines in a wooden fort, the different pieces of which they carried out in

the transports. They met with boisterous weather, impenetrable fogs, and violent currents upon the coast of Greenland, which retarded their operations until the season was far advanced. Part of their wooden fort was lost at sea ; and they had neither provision nor fuel sufficient for the winter. The admiral therefore determined to return with as much ore as he could procure : of this they obtained large quantities out of a new mine, to which they gave the name of the Countess of Suffex. They likewise built an house of stone and lime, provided with ovens ; and here, with a view to conciliate the affection of the natives, they left a quantity of small morrice-bells, knives, beads, looking-glasses, leaden pictures, and other toys, together with several loaves of bread. They buried the timber of the fort where it could be easily found next year ; and sowed corn, pease, and other grain, by way of experiment, to know what the country would produce. Having taken these precautions, they sailed from thence in the beginning of September ; and after a month's stormy passage, arrived in England : but this noble design was never prosecuted.

Christian IV. king of Denmark, being desirous of discovering the old Greenland settlement, sent three ships thither, under the command of Captain Godtke Lindenow ; who is said to have reached the east coast of Greenland, where he traded with the savage inhabitants, such as they are still found in the western district, but saw no signs of a civilized people. Had he actually landed in the eastern division, he must have perceived some remains of the ancient colony, even in the ruins of their convents and villages. Lindenow kidnapped two of the natives, who were conveyed to Copenhagen ; and the same cruel fraud * was practised by other two ships which sailed into Davis's Straits, where they discovered divers fine harbours, and delightful meadows covered with verdure. In some places they are said to have found a considerable quantity of ore, every hundred pounds of which yielded twenty-six ounces of silver. The same Admiral Lindenow made another voyage to the coast of Greenland in the year 1606, directing his course to the westward of Cape Farewell. He coasted along the Straits of Davis ; and having made some observations on the face of the country, the harbours and islands, returned to Denmark. Carsten Richards, being detached with two ships on the same discovery, desired the high land on the eastern side of Greenland ; but was hindered by the ice from approaching the shore.

Other expeditions of the same nature have been planned and executed with the same bad success, under the auspices of a Danish company of merchants. Two ships

* Nothing can be more inhuman and repugnant to the dictates of common justice, than this practice of tearing away poor creatures from their country, their families, and connections : unless we suppose them altogether destitute of natural affection ; and that this was not the case with those poor Greenlanders, some of whom were brought alive to Copenhagen, appears from the whole tenor of their conduct, upon their first capture, and during their confinement in Denmark. When first captivated, they rent the air with their cries and lamentations : they even leaped into the sea, and, when taken on board, for some time refused all sustenance. Their eyes were continually turned towards their dear country, and their faces always bathed in tears. Even the countenance of his Danish majesty, and the caresses of the court and people, could not alleviate their grief. One of them was perceived to shed tears always when he saw an infant in the mother's arms ; a circumstance from whence it was naturally concluded, that he had left his wife with a young child in Greenland. Two of them went to sea in their little canoes, in hope of reaching Greenland : but one of them was retaken. Other two made the same attempt : but were driven by a storm on the coast of Schonen, where they were apprehended by the peasants, and reconveyed to Copenhagen. One of them afterwards died of a fever, caught in fishing pearl, during the winter, for the governor of Kolding. The rest lived some years in Denmark : but at length, seeing no prospect of being able to revisit their native country, they sunk into a kind of melancholy disorder, and expired.

ships returned from the western part of Greenland loaded with a kind of yellow sand, supposed to contain a large proportion of gold. This being assayed by the goldsmiths of Copenhagen, was condemned as useless, and thrown overboard : but from a small quantity of this sand, which was reserved as a curiosity, an expert chemist afterwards extracted a quantity of pure gold. The captain, who brought home this adventure, was so chagrined at his disappointment, that he died of grief, without having left any directions concerning the place where the sand had been discovered. In the year 1654, Henry Muller, a rich Dane, equipped a vessel under the command of David de Nelles, who failed to the west coast of Greenland, from which he carried off three women of the country. Other efforts have been made, under the encouragement of the Danish king, for the discovery and recovery of the old Iceland colony in Greenland : but all of them miscarried, and people began to look upon such expeditions as wild and chimerical. At length the Greenland company at Bergen in Norway, transported a colony to the western coast, about the 64th degree of latitude ; and these Norwegians failed in the year 1712, accompanied by the Reverend Hans Egede, to whose care, ability, and precision, we owe the best and most authentic account of modern Greenland. This gentleman endeavoured to reach the eastern district, by coasting southwards, and advanced as far as the States Promontory : but the season of the year, and continual storms, obliged him to return ; and as he could not even find the Strait of Frobisher, he concluded that no such place ever existed. In the year 1724, a ship, being equipped by the company, failed on this discovery, with a view to land on the east side opposite to Iceland ; but the vast shoals of ice, which barricaded that part of the coast, rendered this scheme impracticable. His Danish majesty, in the year 1728, caused horses to be transported to Greenland, in hope that the settlers might by their means travel over land to the eastern district ; but the icy mountains were found impassable. Finally, lieutenant Richards, in a ship which had wintered near the new Danish colony, attempted, in his return to Denmark, to land on the eastern shore ; but all his endeavours proved abortive.

Mr Egede is of opinion, that the only practicable method of reaching that part of the country, will be to coast north-about in small vessels, between the great flakes of ice and the shore ; as the Greenlanders have declared, that the currents continually rushing from the bays and inlets, and running south-westwards along the shore, hinder the ice from adhering to the land ; so that there is always a channel open, through which vessels of small burden might pass, especially if lodges were built at convenient distances on the shore, for the convenience and direction of the adventurers.

That part of the country which is now visited and settled by the Danes and Norwegians, lies between the 64th and 68th degrees of north latitude ; and thus far it is said the climate is temperate. In the summer, which continues from the end of May to the middle of September, the weather is warm and comfortable, while the wind blows easterly ; though even at this time storms frequently happen, which rage with incredible violence ; and the sea-coasts are infested with

fogs that are equally disagreeable and unhealthy. Near the shore, and in the bays and inlets, the low land is clothed with the most charming verdure ; but the inland mountains are perpetually covered with ice and snow. To the northward of the 68th degree of latitude the cold is prodigiously intense ; and towards the end of August all the coast is covered with ice, which never thaws till April or May, and sometimes not till the latter end of June. Nothing can exhibit a more dreadful, and at the same time a more dazzling appearance, than those prodigious masses of ice that surround the whole coast in various forms, reflecting a multitude of colours from the sun-beams, and calling to mind the enchanted scenes of romance. Such prospects they yield in calm weather ; but when the wind begins to blow, and the waves to rise in vast billows, the violent shocks of those pieces of ice dashing against one another, fill the mind with horror.—Greenland is seldom visited with thunder and lightning, but the *Aurora Borealis* is very frequent and bright. At the time of new and full moon, the tide rises and falls upon this coast about three fathoms ; and it is remarkable, that the springs and fountains on shore rise and fall with the flux and reflux of the ocean.

The soil of Greenland varies like that of all other mountainous countries. The hills are very barren, being indeed frozen throughout the whole year ; but the valleys and low grounds, especially near the sea, are rich and fruitful. The ancient Norwegian chronicles inform us, that Greenland formerly produced a great number of cattle ; and that considerable quantities of butter and cheese were exported to Norway ; and, on account of their peculiar excellency, set apart for the king's use. The same histories inform us, that some parts of the country yielded excellent wheat ; and that large oaks were found here, which carried acorns as big as apples. Some of these oaks still remain in the southern parts, and in many places the marks of ploughed land are easily perceived. At present, however, the country is destitute of corn and cattle, though in many places it produces excellent pasture ; and, if properly cultivated, would probably yield grain also. Mr Egede sowed some barley in a bay adjoining to the Danish colony. It sprang up so fast, that, by the latter end of July it was in the full ear ; but being nipped by a night-frost, it never arrived at maturity. This seed was brought from Bergen, where the summer is of greater heat and duration than in Greenland ; but in all probability the corn which grows in the northern parts of Norway would also thrive here. Turnips and coleworts of an excellent taste and flavour are also produced here. The sides of the mountains near the bays are clothed with wild thyme, which diffuses its fragrance to a great distance. The herb tormentil is very common in this country, and likewise many others not described by the botanists. Among the fruits of Greenland we number juniper-berries, blue-berries, bil-berries, and bramble-berries.

Greenland is thought to contain many mines of metal, though none of them are wrought. To the southward of the Danish colony are some appearances of a mine of copper. Mr Egede once received a lump of ore from one of the natives ; and here he found calamine of a yellow colour. He once sent a considerable quantity

Greenland. quantity of sand of a yellow colour, intermixed with streaks of vermilion, to the Bergen company. They probably found their account in this present; for they desired him by a letter to procure as much of that sand as possible: but he was never able to find the place where he saw the first specimen. It was one of the smallest among a great number of islands; and the mark he had set up was blown down by a violent storm. Possibly this might be the same mineral of which Capt. Frobiher brought so much to England. This country produces rock-crystals both red and white, and whole mountains of the asbestos or incombustible flax. Around the colony, which is known by the name of *Good Hope*, they find a kind of ballard marble of various colours, which the natives form into bowls, lamps, pots, &c. All that has been said of the fertility of Greenland, however, must be understood only of that part which lies between the 60th and 65th degrees of latitude. The most northern parts are totally destitute of herbs and plants. The wretched inhabitants cannot find grafs in sufficient quantities to stuff into their shoes to keep their feet warm, but are obliged to buy it from those who inhabit the more southern parts.

The animals which abound most in Greenland are rein-deer, foxes, hares, dogs, and white bears. The hares are of a white colour, and very fat; the foxes are of different colours, white, greyish, and bluish; and smaller than those of Denmark and Norway. The natives keep a great number of dogs, which are large, white, or speckled, and rough, with ears standing upright, as is the case with all the dogs peculiar to cold climates. They are timorous and stupid; and neither bay nor bark, but sometimes howl dismally. In the northern parts the natives yoke them in sledges; which, though heavy laden, they will draw on the ice at the rate of 70 miles in a short winter's day. These poor animals are very ill rewarded for their service; being left to provide for themselves, except when their masters happen to catch a great number of seals. On these occasions the dogs are regaled with the blood and entrails; at other times, they subsist, like wild beads, upon muscles and berries. Here also are found great numbers of ravens, eagles of a prodigious size, falcons, and other birds of prey; and likewise a kind of linnet, which warbles very melodiously. Whales, sword-fish, porpoises, &c. abound on the coasts; also hollybut, turbot, cod, haddock, &c. The more dubious animals also, called *mermaids*, *sea serpents*, and *kraken*, said to be found on the coast of Norway, are said likewise to dwell in these seas. Mr Eggede assures us, that, in the year 1734, the sea-serpent was seen off the new Danish colony, and raised its head mast-high above the surface of the water. See *KRAKEN*, *MERMAID*, and *SEA-SERPENT*.

9 Account of the inhabi-
tants. The people who now inhabit the western coast of Greenland, and who, without doubt, are the descendants of the ancient *Schrellings*, who exterminated the first Iceland colony, bear a near resemblance to the Samoides and Laplanders in their persons, complexions, and way of life. They are short, brawny, and inclined to corpulency; with broad faces, flat noses, thick lips, black hair and eyes, and a yellowish tawney complexion. They are for the most part vigorous and healthy, but remarkably short-lived; few of them

reaching the grand climacteric; and many dying in their infancy, and in the prime of youth. They are subject to a weakness in the eyes, occasioned by the piercing winds and the glare of the snow in the winter-time. The leprosy is known among them, but is not contagious. Those that dwell in the northern parts are miserably tormented with dysenteries, rheums, and pulmonary disorders, boils, and epilepsy. The small-pox being imported among them from Copenhagen in the year 1734, made terrible havoc among these poor people, who are utterly destitute of any knowledge of the medicinal art, and depend entirely for assistance upon their *angekuts* or conjurers. In their dispositions the Greenlanders are cold, phlegmatic, indolent, and slow of apprehension; but very quiet, orderly, and good-natured. They live peaceably together; and have every thing in common, without strife, envying, or animosity. They are civil and hospitable, but slovenly to a degree almost beyond the Hottentots themselves. They never wash themselves with water; but lick their paws like the cat, and then rub their faces with them. They eat after their dogs without washing their dishes; devour the lice which devour them; and even lick the sweat, which they scrape off from their faces with their knives. The women wash themselves with their own urine, which they imagine makes the hair grow; and in the winter-time go out immediately after, to let the liquor freeze upon their skin. They will often eat their victuals off the dirty ground, with out any vessel to hold them in; and devour rotten flesh with the greatest avidity. In times of scarcity they will subsist on pieces of old skin, reeds, sea-weed, and a root called *tugbronet*, dressed with train-oil and fat. The dung of rein-deer taken from the intestines, the entrails of partridges, and all sorts of offals, are counted dainties among these savages; and of the scrapings of seals skins they make delicate pan-cakes. At first they could not taste the Danish provisions without abhorrence; but now they are become extremely fond of bread and butter, though they still retain an aversion to tobacco and spirituous liquors, in which particular they differ from almost all savages on the face of the earth.

The Greenlanders commonly content themselves with one wife; who is condemned, as among other savage nations, to do all the drudgery, and may be corrected, or even divorced, by the husband at pleasure. Heroes, however, and extraordinary personages, are indulged with a plurality of wives. Their young women are generally chaste and bashful; but at some of their feasts, in the midst of their jollity, a man retires with his neighbour's wife behind a curtain made of skins; and all the guests, thus coupled, retire in their turns. The women think themselves happy if an *angekut* or prophet will thus honour them with his caresses. These people never marry within the prohibited degrees of consanguinity, nor is it counted decent in a couple to marry who have been educated in the same family.—They have a number of ridiculous and superstitious customs, among which the two following are the most remarkable. While a woman is in labour, the gossips hold a chamber-pot over her head, as a charm to hasten the delivery. When the child is a year old, the mother licks and flatters it all over, to render it, as she imagines, more strong and hardy.

Greenland.

to
language,
igion,
c.

All the Greenlanders hitherto known speak the same language, though different dialects prevail in different parts of the country. It abounds with double consonants; and is so guttural, that the pronunciation of many words is not to be learned except by those who have been accustomed to it from their infancy. The letters C, D, F, Q, and X, are not known in their alphabet. Like the North Americans, and inhabitants of Kamchatka, they have a great number of long polysyllables. Their words, nouns as well as verbs, are inflected at the end by varying the terminations without the help of articles; but their language being found defective, they have adopted a good many words from the Norwegian dialect. Notwithstanding the endeavours of the Danish missionaries, they have no great reason to boast of the profelytes they have made of the natives of Greenland. These savages pay great deference and respect to the Danes, whom indeed they obey as their masters, and hear the truths of the Christian religion expounded without doubting the veracity of their teachers; but at the same time they listen with the most mortifying indifference, without being in the least influenced by what they have heard. They believe in the immortality of the soul, and the existence of a spirit whom they call *Torngarfuk*; but of whom they have formed the most ridiculous notions. The Angekuts, who are supposed to be his immediate ministers, differ concerning the principles of his existence; some affirming that he is without form or shape; others, that he has the shape of a bear; others, that he has a large human body with only one arm; while others affirm that that he is no larger than a man's finger, with many other absurdities of a similar kind. They have also a peculiar kind of mythology, by which they believe all the elements to be full of spirits, from among which every one of their prophets is supplied with a familiar which they name *Torgack*, and who is always ready when summoned to his assistance.

The Greenlanders are employed all the year round either in fishing or hunting. At sea they pursue whales, morse, seals, fish for eating, and sea-fowl. On shore they hunt the rein-deer in different parts of the country. They drive these animals, which feed in large herds, into a narrower circle or deile, where they are easily slain with arrows. Their bow is made of fir-tree, wound about with the twisted sinews of animals: the string is composed of the same stuff, or of seal skin: the arrow is a good fathom in length, pointed with a bearded iron, or a sharp bone; but those with which they kill birds are blunt, that they may not tear the flesh. Sea-fowls they kill with lances, which they throw to a great distance with surprising dexterity. Their manner of catching whales is quite different from that practised by the Europeans. About 50 persons, men and women, set out in one long boat, which is called a *kone-boat*, from *kone* a "woman," because it is rowed by females only. When they find a whale, they strike him with harpoons, to which are fastened with long lines some seals skins blown up like bladders. These, by floating on the surface, not only discover the back of the whale, but hinder him from diving under water for any length of time. They continue to pursue him until he loses strength, when they pierce him with spears and lan-

ces till he expires. On this occasion they are clad in their spring-coats consisting of one piece, with gloves, boots, caps made of seal-skin so closely laced and sewed that they keep out water. Thus accoutred, they leap into the sea; and begin to slice off the fat, even under water, before the whale is dead.—They have many different ways of killing seals; namely, by striking them with a small harpoon equipped also with an air-bag; by watching them when they come to breathe at the air-holes in the ice, and striking them with spears; by approaching them in the disguise of their own species, that is, covered with a seal-skin, creeping upon the ice, and moving the head from side to side as the seals are accustomed to do. By this stratagem the Greenlanders move towards the unsuspecting seal, and kills him with a spear. The Greenlanders angle with lines made of whale-bone cut very small, by means of which they succeed wonderfully. The Greenland canoe, like that used in Nova Zembla and Hudson's bay, is about three fathoms in length, pointed at both ends, and three quarters of a yard in breadth. It is composed of thin rafts fastened together with the sinews of animals. It is covered with dressed seal-skins both below and above, in such a manner, that only a circular hole is left in the middle, large enough to admit the body of one man. Into this the Greenlander thrusts himself up to the waist, and fastens the skin so tight about him that no water can enter. Thus secured, and armed with a paddle broad at both ends, he will venture out to sea in the most stormy weather to catch seals and sea-fowl; and if he is overset, he can easily raise himself by means of his paddle. A Greenlanders in one of these canoes, which was brought with him to Copenhagen, outstripped a pinnace of 16 oars, manned with choice mariners.—The *kone-boat* is made of the same materials, but more durable; and so large, that it will contain 50 persons with all their tackle, baggage, and provisions. She is fitted with a mast, which carries a triangular sail made of the membranes and entrails of seals, and is managed without the help of braces and bowlines. These *kones* are flat-bottomed, and sometimes 60 feet in length. The men think it beneath them to take charge of them; and therefore they are left to the conduct of the women, who indeed are obliged to do all the drudgery, including even the building and repairing their houses, while the men employ themselves wholly in preparing their hunting implements and fishing tackle.

This country is but thinly inhabited. In the winter the people dwell in huts built of stone or turf: on the one side are the windows, covered with the skins of seals or rein-deer. Several families live in one of these houses, possessing each a separate apartment, before which is a hearth with a great lamp placed on a trevi, over which hangs their kettle: above is a rack or shelf on which their wet clothes are dried. They burn train-oil in their lamps; and instead of wick, they use a kind of moss, which fully answers the purpose. These fires are not only sufficient to boil their victuals; but likewise produce such a heat, that the whole house is like a bagnio. The door is very low, that as little cold air as possible may be admitted. The house within is lined with old skins, and

Greenland. and surrounded with benches for the convenience of strangers. In the summer-time they dwell in tents made of long poles fixed in a conical form, covered in the inside with deers skins, and on the outside with seals skins, dressed so that the rain cannot pierce them.

¹¹
East Greenland. East Greenland was for a long time considered as a part of the continent of West Greenland, but is now discovered to be an assemblage of islands lying between $76^{\circ} 46'$ and $80^{\circ} 30'$ of north latitude, and between 9° and 20° of east longitude. It was discovered by Sir Hugh Willoughby in the 1553, who called it *Greenland*; supposing it to be a part of the western continent. In 1595, it was again visited by William Barentz and John Cornelius, two Dutchmen, who pretended to be the original discoverers, and called the country *Spitzbergen*, or Sharp Mountains, from the many sharp-pointed and rocky mountains with which it abounds. They alleged that the coast discovered by Sir Hugh Willoughby was some other country; which accordingly the Hollanders delineated on their maps and charts by the name of *Willoughby Land*; whereas in fact no such land ever existed; and long before the voyage of these Dutchmen, Stephen Barrows, an English shipmaster, had coasted along a desolate country from N. Lat. 78° to $80^{\circ} 11'$, which was undoubtedly *Spitzbergen*. The sea in the neighbourhood of the islands of *Spitzbergen* abounds very much with whales, and is the common resort of the whale-fishing ships from different countries, and the country itself is frequently visited by these ships; but till the late voyage of the Hon. Capt. Phipps, by order of his Majesty, the situation of it was erroneously laid down. It was imagined that the land stretched to the northward as far as 82° of north latitude; but Capt. Phipps found the most northerly point of land, called *Seven Islands*, not to exceed $80^{\circ} 30'$ of latitude. Towards the east he saw other lands lying at a distance, so that *Spitzbergen* plainly appeared to be surrounded by water on that side, and not joined to the continent of Asia, as former navigators had supposed. The north and west coasts also he explored, but was prevented by the ice from failing so far to the northward as he wished. The coast appeared neither habitable nor accessible. It is formed of high, barren, black rocks, without the least marks of vegetation; in many places bare and pointed; in others covered with snow, appearing even above the clouds. The valleys between the high cliffs were filled with snow and ice. "This prospect," says Capt. Phipps, "would have suggested the idea of perpetual winter, had not the mildness of the weather, the smooth water, bright sun-shine, and constant day-light, given a cheerfulness and novelty to the whole of this romantic scene." The current ran along this coast half a knot an hour, north. The height of one mountain seen here was found by geometrical mensuration to be at one time $1503\frac{1}{2}$ feet, at another $1503\frac{8}{10}$ feet. By a barometer constructed after Dr. Luc's method, the height was found to be $1588\frac{1}{2}$ feet. On this occasion Capt. Phipps has the following remarks. "I cannot account for the great difference between the geometrical measure and the barometrical according to M. de Luc's calculation, which amounts to 84.7 feet. I have no reason to doubt the accuracy of Dr Irving's

observations, which were made with great care. As to the geometrical measure, the agreement of so many triangles, each of which must have discovered even the smallest error, is the most satisfactory proof of its correctness. Since my return I have tried both the theodolite and barometer, to discover whether there was any fault in either; and find them, upon trial, as I had always done before, very accurate."

There is good anchorage in *Schmeerenburg* harbour, lying in N. Lat. $74^{\circ} 44'$ E. Long. $9^{\circ} 50' 45''$, in 13 fathom, sandy bottom, not far from the shore, and well sheltered from all winds. Close to this harbour is an island called *Amsterdam Island*, where the Dutch used formerly to boil their whale-oil; and the remains of some convenience erected by them for that purpose are still visible. The Dutch ships still resort to this place for the latter season of the whale-fishery. —The stone about this place is chiefly a kind of marble, which dissolves easily in the marine acid. There were no appearances of minerals of any kind, nor any signs of ancient or modern volcanoes. No insects, or any species of reptiles, were seen, not even the common earth-worm. There were no springs or rivers; but great plenty of water was produced from the snow which melted on the mountains.

The most remarkable views which these dreary regions present are those called *Icebergs*. They are large bodies of ice filling the valleys between the high mountains. Their face towards the sea is nearly perpendicular, and of a very lively light-green colour. One was about 300 foot high, with a cascade of water issuing from it. The black mountains on each side, the white snow, and greenish coloured ice, composed a very beautiful and romantic picture. Large pieces frequently broke off from the icebergs, and fell with great noise into the water. One piece was observed to have floated out into the bay, and grounded in 24 fathom; it was 50 feet high above the surface of the water, and of the same beautiful colour with the iceberg from which it had separated.

These islands are totally uninhabited, though it doth not appear but that human creatures could subsist on them, notwithstanding their vicinity to the pole. Eight English sailors, who were accidentally left here by a whale-fishing ship, survived the winter, and were brought home next season. The Dutch then attempted to settle a colony on *Amsterdam* island above-mentioned; but all the people perished, not through the severity of the climate, but of the scurvy, owing to the want of those remedies which are now happily discovered, and which are found to be so effectual in preventing and curing that dreadful disease. —The late account also of six Russian sailors who staid four years in this inhospitable country, affords a decisive proof, that a colony might be settled on East Greenland, provided the doing so could answer any good purpose.

GREENOCK, a sea-port town of Scotland, and one of the ports of the city of Glasgow. It is situated 22 miles from that city; and was formerly called the *Bay of St. Lawrence*. The Frith of Clyde here expands into a fine basin four miles wide, and is landlocked on all sides.

GREENWICH, a town of the county of Kent, in England, pleasantly situated on the bank of the Thames,

Greenwich. Thames, about five miles east from London. Here was formerly a royal palace, built by Humphry Duke of Gloucester, enlarged by Henry VII. and completed by Henry VIII. The latter often chose this town for his place of residence; as did also the Queens Mary and Elizabeth, who were born in it. This palace, however, is now pulled down; and what goes by the name of *palace* at present, serves for apartments for the governor of the hospital, and the ranger of the park. This park was walled and planted by Charles II. and hath a hill in the middle, whence there is a noble prospect of London, the Thames, and shipping; also a Royal Observatory, furnished with a complete set of astronomical observations. This observatory in the latest English maps is accounted the place of the first meridian; and the degrees of longitude, either east or west, are accounted from it. But the most remarkable building about Greenwich, is the hospital for superannuated and disabled seamen, and likewise for their widows and children. It is a very noble structure; the wing next London being part of the palace which King Charles II. intended to have erected for himself, and which cost him 36,000 pounds; being finely adorned with all the decorations of painting, sculpture, and architecture. About 2000 old disabled seamen are maintained in it. The nurses, who must be seamens widows, have ten pounds a-year, and such as attend the infirmary, two shillings a-week more. Besides private benefactions, to the amount of about L. 60,000, the parliament, in the year 1732, settled upon this hospital the earl of Derwentwater's estate, to the value of L. 6000 *per annum*. The hall of the hospital is finely painted by Sir James Thornhill. All strangers who see it, pay twopence each; and this income is applied to the support of the mathematical school for the sons of sailors. For the better support of this hospital, every seaman in the royal navy, and in the merchant service, pays sixpence a-month, topped out of their pay, and delivered in at the six-penny receiver's office in Tower-hill.—On this account, a seaman, who can produce an authentic certificate of his being disabled, and rendered unfit for service, by defending any ship belonging to his Majesty's British subjects, or in taking any ship from the enemy, may be admitted into this hospital, and receive the same benefit from it as if he had been in his Majesty's immediate service. Besides the seamen and widows above-mentioned, about 100 boys, the sons of seamen, are bred up for the service of the royal navy; but there are no out-pensioners as at Chelsea. Each of the mariners has a weekly allowance of bread, beef, mutton, pease, cheese, butter, and beer, and one shilling a-week tobacco-money. The tobacco-money of the boatwains is two shillings and sixpence a-week each, that of their mates one shilling and sixpence, and that of the other officers in proportion to their rank. Each common pensioner also, once in two years, has a suit of blue clothes, a hat, three pair of stockings, two pair of shoes, five neck-cloths, three shirts, and two night-caps. The principal officers of the house, are a governor, lieutenant-governor, treasurer, three captains, six lieutenants, two chaplains, a physician, and surgeon, a clerk of the cheque, and an auditor, who have handsome salaries. The profits of the market belong to this hospital,

whose governors have the direction of it. The first hospital founded by an English Protestant, was at Greenwich, in 1560, by one Mr Lambard, (author of a book called the *Perambulation of Kent*), for twenty poor.

Gregarious
Gregory.

GREGARIOUS, among zoologists, a term applied to such animals as do not live solitary, but associate in herds or flocks.

GREGORIAN CALENDAR, that which shews the new and full moon, with the time of Easter, and the moveable feasts depending thereon, by means of epochs disposed through the several months of the Gregorian year. See ASTRONOMY, n^o 295.

GREGORIAN Year. See ASTRONOMY, n^o 295.

GREGORY the Great, was born at Rome, of a patrician family. He discovered such abilities in the exercise of the senatorial employments, that the emperor Justin the younger appointed him prefect of Rome. Pope Pelagius II. sent him nuncio to Constantinople, to demand succours against the Lombards. When he thought of enjoying a solitary life, he was elected Pope by the clergy, the senate, and the people of Rome. Besides his learning and diligence in instructing the church, both by writing and preaching, he had a very happy talent in winning over princes in favour of the temporal as well as spiritual interest of religion. He undertook the conversion of the English, and sent over some monks of his order, under the direction of Augustine their abbot. His morality with respect to the chastity of churchmen was very rigid, asserting that a man who had ever known a woman ought not to be admitted to the priesthood; and he always caused the candidates for it to be examined upon that point. He likewise vigorously exerted himself against such as were found guilty of calumny. However, he flattered the emperor Phocas, while his hands were yet reeking with the blood of Mauritius, and of his three children, who had been butchered in his fight. He likewise flattered Brunehaut, a very wicked queen of France. He is accused of destroying the noble monuments of ancient Roman magnificence, that those who visited the city might not attend more to the triumphal arches, than to holy things; and burnt a multitude of heathen books, Livy in particular. He died in 604.

GREGORY of Nazianzen, surnamed the *Divine*, was one of the most illustrious ornaments of the Greek church in the fourth age. He was made bishop of Constantinople in 397; but finding his election contested by Timotheus, archbishop of Alexandria, he voluntarily resigned his dignity about 382, in the general council of Constantinople. His works are extant, in two volumes, printed at Paris in 1609. His style is said to be equal to that of the most celebrated orators of ancient Greece.

GREGORY (Theodorus), surnamed *Thaumaturgus* on account of his miracles, was the scholar of Origen; and was elected bishop of Neocesarea, the place of his birth, about the year 240, during his absence. He assisted at the council of Antioch, in 255, against Paulus Samocetanus; and died in 270. He had the satisfaction of leaving only seventeen idolaters in his diocese, where there were but seventeen Christians when he was ordained. There is still extant of his, A gratulatory oration to Origen, A canonical epistle, and some other works.

Gregory.

GREGORY, bishop of Nyssa, one of the fathers of the church, and author of the Nicene creed, was born in Cappadocia, about the year 331. He was chosen bishop of Nyssa in 372, and banished by the emperor Valens for adhering to the council of Nice. He was nevertheless afterwards employed by the bishops in several important affairs, and died in 396. He wrote, Commentaries on the Scriptures; Sermons on the mysteries; Moral discourses; Dogmatical treatises; Panegyrics on the saints; some letters on church discipline; and other works. His style is very allegorical and affected.

GREGORY of Tours, or *Georgius Florentius Gregorius*, one of the most illustrious bishops, and celebrated writers of the sixth century, was descended from a noble family in Auvergne. He was educated by his uncle Gallus, bishop of Clermont; and distinguished himself so much by his learning and virtue, that in 573 he was chosen bishop of Tours. He afterwards went to Rome to visit the tomb of the apostles, where he contracted a friendship with Gregory the Great, and died in 595. This author was extremely credulous with regard to miracles. He wrote, 1. The history of France. 2. The lives of the saints; and other works. The best edition is that published by Father Rumart, 1699.

GREGORY (James), an eminent mathematical genius of Scotland, was born at Aberdeen in 1639, and educated at that university. He made a good progress in classical learning; but being more delighted with philosophical researches, the works of Des Cartes and Kepler were his principal study; and he began early to make improvements on their discoveries in optics. The first of these improvements was the invention of the reflecting telescope, which still bears his name; and which was so happy a thought, that that has given occasion to the most considerable improvements made in optics since the invention of the telescope.

He published the construction of this instrument in 1663, at the age of 24; and coming next year or the year after that to London, he became acquainted with Mr John Collins, who recommended him to the best optic glass grinders there, in order to have it executed. But as this could not be done for want of skill in the artists to grind a plate of metal for the object speculum into a true parabolic concave, which the design required, he was much discouraged thereby; and after a few imperfect trials made with an ill polished spherical one, which did not succeed to his wish, he dropped the pursuit, and resolved to make the tour of Italy, then the mart of mathematical learning, in the view of prosecuting his favourite study with greater advantage.

He had not been long abroad, when the same inventive genius which had before shewed itself in practical mathematics, carried him to some new improvements in the speculative part. The sublime geometry on the doctrine of curves was then hardly past its infant state; and the famed problem of squaring the circle still continued a reproach to it, when our author discovered a new analytical method of summing up an infinite converging series, whereby the area of the hyperbola, as well as of the circle, may be computed to any degree of exactness. He was then at

Padua; and getting a few copies of his invention printed there in 1667, he sent one to his friend Mr Collins, who communicated it to the Royal Society, where it met with the commendations of lord Brouncker and Dr Wallis. Our author printed it at Venice, and published it the following year 1668; together with another piece, wherein he first of any one entertained the public with an account of the transformation of curves. An account of this piece was also read by Mr Collins before the Royal Society, of which Mr Gregory, being returned from his travels, was chosen a member, and communicated to them an account of the controversy in Italy about the motion of the earth, which was denied by the famous astronomer Riccioli and his followers.

The same year his quadrature of the circle being attacked by the celebrated Mr Huygens, a controversy arose between these two eminent mathematicians, in which our author produced some improvements of his series.

In 1672, Sir Isaac Newton, in his wonderful discoveries on the nature of light, having contrived a new reflecting telescope, made several objections to Mr Gregory's. This gave occasion to a controversy betwixt these two philosophers, which was carried on this and the following year in the most amicable manner on each side. Mr Gregory defended his own construction, but gave his antagonist the whole honour of having made the catoptric telescopes preferable to the dioptric ones; shewing that the imperfections in these instruments were not so much owing to a defect in the object speculum, as to the different refrangibility of the rays of light. In the course of this dispute our author described a burning concave mirror, which was approved by Sir Isaac, and is still in good esteem.

All this while he attended the proper business of his professorship with great diligence; which, taking up the greatest part of his time, especially in the winter season, hindered him in the pursuit of his proper studies. These, however, led him to farther improvements in the invention of infinite series, which he occasionally communicated to his friend and correspondent Mr Collins, who might have had the pleasure of receiving many more, had not our professor's life been cut short by a fever in December 1675, at the age of 36 years.

Besides the inventions already mentioned, he was the first who gave a geometrical demonstration of lord Brouncker's series for squaring the hyperbola, as it had been explained by Mercator in his *Logarithmotechnia*. He was likewise the first who demonstrated the meridian line to be analogous to a scale of logarithmic tangents of the half complement of latitude. He also invented, and demonstrated geometrically, by the help of the hyperbola, a very swift converging series for making the logarithms, and therefore recommended by Dr Halley as very proper for practice. He also sent to Mr Collins the solution of the famous Keplerian problem by an infinite series. He found out a method of drawing tangents to curves geometrically, without any previous calculations. He gave a rule for the direct and inverse method of tangents, which stands upon the same principle (of exhaustions) with the fluxions, and differs not much from it in the method

Gregory.

Gregory.

of application. He likewise gave a series for the length of the area of a circle from the tangent, and *vice versa*; as also for the secant and logarithmic tangent and secant, and *vice versa*. These, with others for certifying or measuring the length of the elliptic and hyperbolic curves, were sent to Mr Collins in return for some received from him of Sir Isaac Newton's; and their elegance being admirable, above whatever he had produced before, and after the manner of Sir Isaac Newton, gave room to think that he had improved himself greatly by that matter, whose example he followed in giving his series in simple terms, independent of each other. These several inventions are contained, 1. In his *Optica promota*, &c. 4to. edit. 1663. 2. *Vera circuli & hyperbole quadratura*, Padua 1667. 3. *Geometrie pars universalis*, &c. 1667, 4to. 4. Several letters and papers printed in the *Philosophical Transactions*; the *Journal des Sçavans*; the *Commerc. epistol. Jo. Collins & alior.* 1715, 8vo. and in the Appendix to the English edition of Dr David Gregory's *Elements of Optics*, 1735, 8vo. by Dr De-faguliers.

GREGORY (David), nephew of the preceding, was born June 24th, 1661, at the same place, where he also received the first grounds of his learning; but was afterwards removed to Edinburgh, and took the degree of master of arts in that university. The great advantage of his uncle's papers induced his friends to recommend the mathematics to him; and he had a natural subtilty of genius, which particularly fitted him for that study, to which he applied with insatiable industry; and succeeded so well, that he was advanced to the mathematical chair at Edinburgh, at the age of 25: and the same year he published a treatise entitled, *Exercitatio geometrica de dimensione figurarum*, Edinb. 1684, 4to.

He had already seen some hints in his uncle's papers concerning Sir Isaac Newton's method, of which he made the best use he could, and the advantage he found thereby raised an ardent desire in him to see that method published. Under this impatient expectation, the *Principia* was no sooner out in 1687, but our author took it in hand, and presently made himself so much master of it as to be able to read his professorial lectures upon the philosophy contained in it; and causing his scholars to perform their exercises for their degrees upon several branches of it, became its first introducer into the schools.

He continued at Edinburgh till the year 1691; when hearing the news of Dr Bernard's intention to resign the Savilian professorship at Oxford, he left Scotland, and, coming to London, was admitted a member of the Royal Society. Proceeding to Oxford, he was elected astronomical professor there, having been first admitted of Balliol-college, incorporated master of arts, and created doctor of physic. He had no relish for the technical part of his profession, and was seldom seen in the observatory. His genius lay more to geometry, in which he distinguished himself both by his *Elements of Optics*, and of *Physical and geometrical astronomy*. This last is reckoned his masterpiece; and having finished it in 1702, he immediately engaged in carrying on the noble design of his predecessor, Dr Bernard, to print all the works of the ancient mathematicians; the first fruits of which appeared in an

edition of Euclid's works in Greek and Latin, in folio, the following year; and, in the same design, he afterwards joined with his colleague Dr Halley, in preparing an edition of *Apollonius's Conics*. Dr Bernard had the materials for the first four books, which our author undertook to complete, but was prevented by his death, which happened Oct. 16. 1710.

GREGORY (Dr John), professor of medicine in the university of Edinburgh, was born in May 1725. His father was professor of medicine in the King's-college, Aberdeen; and his grandfather was professor of mathematics, first at St Andrews, and afterwards at Edinburgh. Thus Dr Gregory was the third professor of his family in a lineal descent. But it deserves to be remarked, that from his great-grandfather David Gregory, esq; of Kinnaird in Aberdeenshire, he was the 15th descendant who had held a professorship in a British university.

Dr Gregory began the study of medicine at Aberdeen; which he afterwards prosecuted, first at Edinburgh, next at Leyden, and then at Paris. In the 20th year of his age he was elected professor of philosophy in king's-college, Aberdeen; and had, at the same time, the degree of doctor of medicine conferred upon him. In the year 1756, upon the death of his brother Dr James Gregory, who had succeeded his father as professor of medicine, he was elected to that chair. But about the beginning of the year 1765, he left Aberdeen, and came to Edinburgh. Soon after this he was appointed professor of the practice of medicine in the university there, in the room of Dr Rutherford, who resigned in his favour. The year following, upon the death of Dr White, he was nominated first physician to his majesty for Scotland. Thus, at the time of his death, besides very extensive practice, he enjoyed the highest and most important offices in the way of his profession, which could be obtained in his native country.

These distinguishing honours were universally allowed to be the just reward of singular merit. Of this the writings which he published will bear ample testimony to future ages. His first publication, which is entitled, *A comparative view of the faculties of man with those of the animal world*, made its appearance in 1765. This production, while it demonstrates the author to have been a philosopher whose reflections were just and original, at the same time displays a liberality of sentiment seldom to be equalled. Such was the avidity with which it was read, that in the space of two years it went through four editions; and, while it was perused by all with peculiar pleasure, it was honoured by those distinguished for taste and literature with high approbation.

In the year 1770, a second work of Dr Gregory's made its appearance; but without his consent, and even contrary to his inclination. His preliminary lectures on the practice of physic were heard by his pupils with universal satisfaction. From a copy of these lectures taken down in short-hand, there was published a book entitled, "Observations on the duties and office of a physician, and on the method of prosecuting inquiries in philosophy." Although these lectures were not intended for the press, and did not pass through the finishing hand of the author before they were presented to the public; yet such was

Gregory.

the matter they contained, that, had they appeared in a much worse dress, they could have done him no discredit. In these lectures, by the most forcible arguments, he laboured to convince his pupils, that a physician who studies the principles of his profession, who has an extensive acquaintance with every branch of natural knowledge, and who properly applies his knowledge, must have an infinite advantage, as a practitioner, over one who is ignorant of the theory of medicine, and of every science connected with it. He endeavoured to persuade them, that genius and sense, which indeed are the peculiar gifts of heaven, are yet capable of high improvement; and that, without improvement, they can be but of little account either to the public, or to an individual. In short, no argument was omitted which could prompt them to study medicine with attention and ardour, and afterwards to practise it with prudence and humanity.—Dr Gregory, however, was dissatisfied with the dress in which this work appeared. Soon after, therefore, he published an edition of it himself, in which his former sentiments are set off with all the advantages which can be derived from a correct and elegant style. His last publication, *Elements of the practice of physic*, was intended as a syllabus to his lectures; and in it he meant to have comprehended all the diseases of which he usually treated. But not having leisure to finish the whole, he was obliged to stop at those diseases which are usually reckoned febrile. Although this work appears with all those disadvantages, under which every text must labour; yet it sufficiently shews how the author thought and acted in the exercise of his profession. The world was deprived of this excellent person in February 1774. He left behind him a small, but inestimable production, under the title of *A father's legacy to his daughters*, designed for their private instructions; but rendered a common bequest by the benevolence of his eldest son, who gave it to the public after his death. The maxims and advices it contains, which are classed under the general topics—of religion, of conduct and behaviour, of amusements, of friendship, love, and marriage,—are as just as they are important; and appear to be the dictates of a mind which had long been inviolably attached to the interests of virtue; the results of an observation equally interesting, extensive, and mature. They are delivered in a style which is simple and unadorned; yet chastised with that elegance and correctness which result from the operations of a mind habitually governed by a refined taste, and the clearest judgement.

Had Dr Gregory lived to a more advanced age, the world would probably have been favoured with other works no less honourable to the author than beneficial to mankind. But his extensive practice, and his zeal in his duty as a professor, occupied the greater part of his time.

To pretend to enumerate the many advantages which his pupils derived from him in the capacity of a teacher, would exceed our limits. Let it suffice to say, that, from the extent of his views, from the justice and importance of his observations, and from the force and accuracy of his reasoning, every hearer obtained the most thorough conviction of his abilities, and retired from academical labours both pleased and

instructed.

To conclude: Dr Gregory was not more eminent as a physician, than he was amiable and respectable as a man. With the mathematical genius of his family he united a correct taste for the fine arts, and a high relish for every social virtue. He possessed a clear and vigorous understanding; a chaste and lively imagination; and an affectionate and feeling heart: and while he was distinguished for paternal and conjugal attachment, he was a constant friend to poverty and distress, and an unwearied patron of science and virtue.

GRE-HOUND. See CANIS.—Among a litter of gre-hound puppies, the best are always those which are lightest. These will make the nimblest dogs as they grow up. The gre-hound is best for open countries where there is little covert. In these places there will sometimes be a course after a hare of two or three miles or more, and both the dogs and the game in sight all the while. It is generally supposed that the gre-hound bitch will beat the dog in running: but this seems to be an error; for the dog is both longer-made, and considerably stronger, than the bitch of the same kind. In the breeding these dogs the bitch is principally to be regarded; for it is found by experience, that the best dog and a bad bitch will not get so good puppies as an indifferent dog with a good bitch. The dog and bitch should be as nearly as may be of the same age; and for the breeding of fine and perfect dogs, they should not be more than four years old. An old bitch may be used with a young dog, but the puppies of a young bitch and an old dog will never be good for any thing.

The general food for a gre-hound, ought to be chippings or raspings of bread, with soft bones and gristles; and those chippings ought always to be soaked in beef or mutton broth.

The proper exercise for a gre-hound is coursing him three times a-week, and rewarding him with blood; which will animate him in the highest degree, and encourage him to prosecute his game. But the hare also should ever have fair play. She should have the law, as it is called; that is, have leave to run about twelve score yards before the dog is slipped at her, that he may have some difficulty in the course, and not pick up the game too early. If he kills the hare, he must never be suffered to tear her; but she must be taken from him, his mouth cleaned of the wool, and the liver and lights given him by way of encouragement. Then he is to be led home, and his feet washed with butter and beer, and about an hour after he is to be fed.

When the dog is to be taken out to course, he should have nothing in the morning but a toast and butter, and then he is to be kennelled till taken out to the field. The kennelling these dogs is of great use, always giving them spirit and nimbleness when they are let loose; and the best way of managing a fine gre-hound is, never to let him stir out of the kennel, except at the times of feeding, walking, or coursing.

GRENADE, one of the Caribbee islands, lying in W. Long. 61. 40. N. Lat. 12. 0. It is the last of the Windward Caribbees; and lies 30 leagues north of New Andalusia, on the continent. According to some, it is 24 leagues in compass; according to others, only

only 22; and it is said to be 30 miles in length, and in some places 15 in breadth. The chief port is called *Lesoir*; and stands on the west side of the island, in the middle of a large bay, with a sandy bottom. It is pretended that 1000 barks, from 300 to 400 tons, may ride secure from storms; and that 100 ships, of 1000 tons each, may be moored in the harbour. A large round basin, which is parted from it by a bank of sand, would contain a considerable number of ships, if the bank was cut through: but by reason of it, the large ships are obliged to pass within 80 paces of one of the mountains lying at the mouth of the harbour; the other mountain lying about half a mile distant. The island abounds with wild game and fish; it produces also very fine timber, but the cocoa-tree is observed not to thrive here so well as in the other islands. A lake on a high mountain, about the middle of the island, supplies it with fresh-water streams. Several bays and harbours lie round the island, some of which might be fortified to great advantage; so that it is very convenient for shipping, not being subject to hurricanes. The soil is capable of producing tobacco, sugar, indigo, pease, and millet.

In 1638, M. Poincy, a Frenchman, attempted to make a settlement in Grenada; but was driven off by the Caribbeans, who resorted to this island in greater numbers than to the neighbouring ones, probably on account of the game with which it abounded. In 1650, Mons. Parquet, governor of Martinico, carried over from that island 200 men, furnished with presents to reconcile the savages to them; but with arms to subdue them, in case they should prove intractable. The savages are said to have been frightened into submission by the number of the Frenchmen: but, according to some French writers, the chief not only welcomed the new-comers; but in consideration of some knives, hatchets, scissars, and other toys, yielded to Parquet the sovereignty of the island, reserving to themselves their own habitations. The Abbe Raynal informs us, that these first French colonists, *imagining* they had purchased the island by these trifles, assumed the sovereignty, and soon acted as tyrants. The Caribs, unable to contend with them by force, took their usual method of murdering all those whom they found in a defenceless state. This produced a war; and the French settlers having received a reinforcement of 300 men from Martinico, forced the savages to retire to a mountain; from whence, after exhausting all their arrows, they rolled down great logs of wood on their enemies. Here they were joined by other savages from the neighbouring islands, and again attacked the French, but were defeated anew; and were at last driven to such desperation, that 40 of them, who had escaped from the slaughter, jumped from a precipice into the sea, where they all perished, rather than fall into the hands of their implacable enemies. From thence the rock was called *le morne des sauteurs*, or "the hill of the leapers;" which name it still retains. The French then destroyed the habitations and all the provisions of the savages; but fresh supplies of Caribbeans arriving, the war was renewed with great vigour, and great numbers of the French were killed. Upon this they resolved totally to exterminate the natives: and having accordingly attacked the savages unawares,

they inhumanly put to death the women and children, as well as the men; burning also their boats and canoes, to cut off all communication between the few survivors and the neighbouring islands. Notwithstanding all these barbarous precautions, however, the Caribbees proved the irreconcilable enemies of the French, and their frequent insurrections at last obliged Parquet to sell all his property in the island to the Count de Cerillac in 1657. The new proprietor, who purchased Parquet's property for 30,000 crowns, sent thither a person of brutal manners to govern the island. He behaved with such insupportable tyranny, that most of the colonists retired to Martinico; and the few who remained condemned him to death, after a formal trial. In the whole court of justice that tried this miscreant, there was only one man (called *Archangel*) who could write. A farrier was the person who impeached: and he, instead of the signatures, sealed with a horse-shoe; and Archangel, who performed the office of clerk, wrote round it these words in French, "Mark of Mr de la Brie, council for the court."

It was apprehended that the court of France would not ratify a sentence passed with such unusual formalities; and therefore most of the judges of the governor's crimes, and witnesses of his execution, disappeared. Only those remained whose obscurity screened them from the pursuit of the laws. By an estimate, taken in 1700, there were at Grenada no more than 251 white people, 53 free savages or mulattoes, and 525 slaves. The useful animals were reduced to 64 horses, and 569 head of horned cattle. The whole culture consisted of three plantations of sugar, and 52 of indigo.—The island had been sold in 1664 to the French West India company for 100,000 livres.

This unfavourable state of the affairs of Grenada was changed in 1714. The change was owing to the flourishing condition of Martinico. The richest of the ships from that island were sent to the Spanish coasts, and in their way touched at Grenada to take in refreshments. The trading privateers, who undertook this navigation, taught the people of that island the value of their soil, which only required cultivation. Some traders furnished the inhabitants with staves and utensils to erect sugar-plantations. An open account was established between the two colonies. Grenada was clearing its debts gradually by its rich produce; and the balance was on the point of being closed, when the war, in 1744, interrupted the communication between the two islands, and at the same time stopped the progress of the sugar-plantations. This loss was supplied by the culture of coffee, which was pursued during the hostilities with all the activity and eagerness that industry could inspire.—The peace of 1748 revived all the labours, and opened all the former sources of wealth. In 1753 the population of Grenada consisted of 1262 white people, 175 free negroes, and 11,991 slaves. The cattle amounted to 2298 horses or mules, 2456 head of horned cattle, 3278 sheep, 902 goats, and 331 hogs. The cultivation rose to 83 sugar-plantations; 2,725,600, coffee-trees; 150,300 cocoa-trees, and 800 cotton-plants. The provisions consisted of 5,740,450 trenches of cassia; 933,596 banana trees; and 143 squares of potatoes and

Grénada.

and yams. The colony made a rapid progress, in proportion to the excellence of its soil; but in the course of last war, the island was taken by the British. At this time one of the mountains at the side of *Lewis* harbour was strongly fortified, and might have made a good defence, but surrendered without firing a gun; and, by the treaty concluded in 1763, the island was ceded to Britain. On this cession, and the management of the colony after that event, the Abbe Raynal has the following remarks:—"This long train of evils [the ambition and mismanagement of his countrymen] has thrown Grenada into the hands of the English, who are in possession of this conquest by the treaty of 1763. But how long will they keep this colony? Or, will it never again be restored to France?—England has not made a fortunate beginning. In the first enthusiasm raised by an acquisition, of which the highest opinion had been previously formed, every one was eager to purchase estates there. They sold for much more than their real value. This caprice, by expelling old colonists, who were inured to the climate, has sent about L. 1,553,000 out of the mother-country. This imprudence has been followed by another. The new proprietors, misled, no doubt, by national pride, have substituted new methods to those of their predecessors. They have attempted to alter the mode of living among their slaves. The negroes, who from their very ignorance are more attached to their customs than other men, have revolted. It hath been found necessary to send out troops, and to shed blood. The whole colony was filled with suspicions. The masters who had laid themselves under a necessity of using violent methods, were afraid of being burnt or massacred in their own plantations. The labours have declined, or been totally interrupted. Tranquillity has at length been restored. The number of slaves has been increased as far as 40,000, and the produce has been raised to the treble of what it was under the French government.

"The plantations will still be improved by the neighbourhood of a dozen of islands, called the *Grenadines* or *Grenadilles*, that are dependent on the colony. They are from three to eight leagues in circumference, but do not afford a single spring of water. The air is wholesome. The ground, covered only with thin bushes, has not been screened from the sun. It exhales none of those noxious vapours which are fatal to the husbandman.

"*Cariacou*, the only one of the Grenadines which the French have occupied, was at first frequented by turtle fishermen; who, in the leisure afforded them by so easy an occupation, employed themselves in clearing the ground. In process of time, their small number was increased by the accession of some of the inhabitants of *Guadalupe*; who, finding that their plantations were destroyed by a particular sort of ants, removed to *Cariacou*. The island flourished from the liberty that was enjoyed there. The inhabitants collected about 1200 slaves, by whose labours they made themselves a revenue of near L. 20,000 a year in cotton.—The other Grenadines do not afford a prospect of the same advantages, though the plantation of sugar is begun there. It has succeeded remarkably well at *Beconya*, the largest and most fertile of these is-

lands, which is no more than two leagues distant from *St. Vincent*."

All these islands have lately been reduced again under the power of France, and the inhabitants treated with inhumanity and injustice.

GRENADINES, or **GRENADILLOS**. See the preceding article.

GRENOBLE, a large, populous, and ancient town of Dauphiny in France, with a bishop's see. It contains a great number of handsome structures, particularly the churches and convents. The leather and gloves that are made here are highly esteemed. It is seated on the river *Isere*, over which there are two bridges to pass into that part called *Perriere*, a large tract on the other side of the river. E. Lon. 5. 49. N. Lat. 45. 12.

GRESHAM (Sir Thomas), an opulent merchant of London, descended from an ancient and honourable family of Norfolk, was born in 1519. He was, as his father had been before him, appointed king's agent at Antwerp, for taking up money of the merchants; and, in 1551, he removed to that city with his family. This employment was suspended on the accession of queen Mary; but, on proper representations, was restored to him again. Queen Elizabeth conferred the honour of knighthood upon him, and made him her agent in foreign parts. It was at this time he thought proper to provide himself with a mansion-house in the city, suitable to his station and dignity; with which intention he built that large house on the west side of Bishopgate-street, afterwards known by the name of *Gresham-college*. His father had proposed building a house or exchange for the merchants to meet in, instead of walking in the open street; but this design remained for the son to accomplish. Sir Thomas went beyond his father: he offered, if the citizens would provide a proper piece of ground, to build a house at his own expence; which being accepted, he fulfilled his promise after the plan of the exchange at Antwerp. When the new edifice was opened, the queen (Jan. 29, 1570,) came and dined with the founder; and caused a herald with a trumpet to proclaim it by the name of the *Royal Exchange*. In pursuance also of a promise to endow a college for the profession of the seven liberal sciences, he made a testamentary disposition of his house in London for that purpose; leaving one moiety of the royal exchange to the corporation of London, and the other to the mercer's company, for the salaries of seven lecturers in divinity, law, physic, astronomy, geometry, music, and rhetoric, at 50*l.* each *per ann.* He left several other considerable benefactions, and died in 1579.—Those who have drawn Sir Thomas's character observe, that he had the happiness of a mind every way suited to his fortune, generous and benign; ready to perform any good actions, and encourage them in others. He was a great friend and patron of our celebrated martyrologist John Fox. He was well acquainted with the ancient and several modern languages; he had a very comprehensive knowledge of all affairs relating to commerce, whether foreign or domestic; and his success was not less, being in his time esteemed the highest commoner in England. He transacted queen Elizabeth's mercantile affairs so constantly, that he was called *the royal merchant*; and his

reville. his house was sometimes appointed for the reception of foreign princes upon their first arrival at London.

GREVILLE (Fulke) lord Brook, of Beauchamp's Court in Warwickshire, a poet and miscellaneous writer, was born in the year 1554, and descended from the noble families of Beauchamps of Powick and Willoughby de Brook. In company with his cousin Sir Philip Sidney, he began his education at a school in Shrewsbury: thence he went to Oxford, where he remained for some time a gentleman commoner, and then removed to Trinity-college in Cambridge. Having left the university: he visited foreign courts, and thus added to his knowledge of the ancient languages a perfect knowledge of the modern. On his return to England he was introduced to queen Elizabeth by his uncle Robert Greville, at that time in her majesty's service; and by means of Sir Henry Sidney, lord president of Wales, was nominated to some lucrative employments in that principality.

In the year 1581, when the French commissioners who came to treat about the queen's marriage with the duke of Anjou were sumptuously entertained with tilts and tournaments, Mr Greville, who was one of the challengers, so signalized himself, as to "win the reputation of a most valiant knight." He continued a constant attendant at court, and a favourite with the queen to the end of her reign, during which he obtained the office of treasurer of marine causes, also a grant of the manor of Wedgnoek, and likewise the honour of knighthood. In this reign he was several times elected member for the county of Warwick; and from the journals of the house seems to have been a man of business, as his name frequently appears in committees.

On the accession of king James I. he was installed knight of the Bath; and soon after obtained a grant of the ruinous castles of Warwick, which he repaired at a considerable expence, and where he probably resided during the former part of this reign: but in the year 1614, the twelfth of James I. he was made under-treasurer and chancellor of the exchequer, one of the privy-council, and gentleman of the bed-chamber; and, in the 1620, was raised to the dignity of a baron, by the title of lord Brook of Beauchamp's Court. He was also privy-counsellor to king Charles I. in the beginning of whose reign he founded a history-lecture in Cambridge.

Having thus attained the age of 74, through a life of continued prosperity, universally admired as a gentleman and a scholar, he fell by the hand of an assassin, one of his own domestics, who immediately stabbed himself with the same weapon with which he had murdered his master. This fellow's name was Haywood; and the cause is said to have been a severe reprimand for his presumption in upbraiding his master for not providing for him after his death. It seems he had been witness to lord Brook's will, and knew the contents. Some say he stabbed him with a knife in the back; others, with a sword. This affair happened at Brook-house in Holborn.—Lord Brook was buried with great pomp, in St Mary's church at Warwick, in his own vault, over which he had erected a monument of black and white marble, ordering at his death the following inscription to be engraven upon the tomb. "Fulke Greville, servant to

queen Elizabeth, counsellor to king James, and friend to Sir Philip Sidney. *Trophæum peccati*." He wrote several works, both in verse and prose; among which are, 1. Two tragedies, Alaham and Multapha. 2. A treatise of human learning, &c. in verse, folio. 3. The life of Sir Philip Sidney. 4. An inquisition upon fame and honour, in 86 stanzas. 6. *Calica*, a collection of 109 songs. 7. His remains, consisting of political and philosophical poems.

GREW (Nehemiah), a learned English writer in the 17th century, had a considerable practice as a physician in London, and succeeded Mr Oldenburgh in the office of secretary to the royal society. In this capacity, pursuant to an order of council, he drew up a catalogue of the natural and artificial rarities belonging to the society, under the title of *Museum Regalis Societatis*, &c. 1681. He also wrote, besides several pieces in the Philosophical Transactions. 1. The comparative anatomy of the stomach and guts, folio. 2. The anatomy of plants, folio. 3. *Tractatus de saltu cathartici natura et usu*. 4. *Cosmologia sacra*, or a discourse of the universe as it is the creature and kingdom of God; folio. He died suddenly in 1721.

GREWIA, in botany; a genus of the polyandria order, belonging to the gynandria class of plants.

Species. 1. The occidentalis, with oval created leaves, has long been preserved in many curious gardens both in England and Holland. It is a native of the Cape of Good Hope, and grows to the height of ten or twelve feet. The stem and branches greatly resemble those of the small-leaved elm, the bark being smooth, and of the same colour with that when young. The leaves are also very like those of the elm, and fall off in autumn. The flowers are produced singly along the young branches from the wings of the leaves, and are of a bright purple colour. 2. The Africana, with oval spear-shaped serrated leaves, is a native of Senegal in Africa, from whence its seeds were brought by Mr Adanson. In this country it rises with a shrubby stalk five or six feet high, sending out many lateral branches, with a brown hairy bark, and garnished with spear-shaped, serrated leaves; but the plants have not flowered in Britain.

Culture and uses. The first sort, though a native of a warm climate, will bear the open air in this country; only requiring to be sheltered in a green-house during the winter-time. It may be propagated by cuttings or layers planted in pots filled with soft loamy earth. The second sort is tender, and must be kept constantly in a warm bark-house. In summer, they require a large share of the free air to be admitted to them, and should have water three or four times a week in warm weather; but in the winter they must be sparingly watered. — The negroes of Senegal highly value a decoction of the bark of this last species, and use it as a never-failing remedy against venereal complaints.

GREY or GRAY, a mixed colour, partaking of the two extremes black and white. See BLACK, n^o 8, 9, 10.

GREY (Lady Jane), a most illustrious and unfortunate lady, descended of the blood-royal of England by both parents, was the eldest daughter of Henry Grey marquis of Dorset and Francis the daughter of Charles Brandon lord Suffolk, by Mary dowager

dowager of Lewis XII. king of France, who was the youngest daughter of Henry VII. king of England. She was born in the year 1537, at Broadgate, her father's seat in Leicestershire. She discovered an early propensity to all kinds of good literature; and having a fine genius, improved under the tuition of Mr Elmer, she made a most surprising progress in the languages, arts, and sciences. She understood perfectly both kinds of philosophy, and could express herself very properly at least in the Latin and Greek tongues; and we are informed by Sir Thomas Chaloner (in Strype's memorials, vol. iii. p. 93.) that she was well versed in Hebrew, Chaldee, Arabic, French, and Italian; "and (he adds), she played well on instrumental music, writ a curious hand, and was excellent at the needle." Chaloner also tells us, that she accompanied her musical instruments with a voice exquisitely sweet in itself, assisted by all the graces that art could bestow.

In the year 1553, the dukes of Suffolk and Northumberland, who were now, after the fall of Somerset, arrived at the height of power, began, on the decline of the king's health, to think how to prevent that reverse of fortune which, as things then stood, they foresaw must happen upon Edward's death. To obtain this end, no other remedy was judged sufficient but a change in the succession of the crown, and transferring it into their own families, by rendering Lady Jane queen. Those most excellent and amiable qualities which had rendered her dear to all who had the happiness to know her, joined to her near affinity to the king, subjected her to become the chief tool of an ambition so notoriously not her own. Upon this very account she was married to lord Guilford Dudley, fourth son of the duke of Northumberland, without discovering to her the real design of the match; which was celebrated with great pomp in the latter end of May, so much to the king's satisfaction, that he contributed bounteously to the expence of it from the royal wardrobe. The young king Edward VI. died in July following; and our fair scholar, with infinite reluctance, overpowered by the solicitations of her ambitious friends, allowed herself to be proclaimed queen of England, on the strength of a deed of settlement extorted from that prince by her father-in-law the duke of Northumberland, which set aside the succession of queen Mary, queen Elizabeth, and Mary queen of Scots. Her regal pageantry continued but a few days. Queen Mary's undoubted right prevailed; and the unfortunate lady Jane Grey and her husband were committed to the tower, and on the 13th of November arraigned and found guilty of high treason. On the 12th of February following they were both beheaded on Tower-hill. Her magnanimity in this dreadful catastrophe was astonishing. Immediately before her execution, she addressed herself to the weeping multitude with amazing composure and coherency: she acknowledged the justice of the law, and died in charity with that wretched world which she had so much reason to execrate. Thus did the pious Mary begin her reign with the murder of an innocent young creature of 18; who for simplicity of manners, purity of heart, and extensive learning, was hardly ever equalled in any age or country. But alas! Jane was an obstinate heretic.—A few

days before her execution, Fleckenham, the queen's chaplain, with a pious intention to rescue her poor soul from eternal misery, paid her frequent visits in the tower, and used every argument in his power to convert her to the popish religion: but he found her so much his superior in argument, that he gave up the contest; resigning her body to the block, and her soul to the devil.

Her writings are, 1. Four Latin epistles; three to Bullenger, and one to her sister lady Catharine. The last was written, the night before her execution, in a blank leaf of a Greek Testament. Printed in a book entitled *Epistolæ Helveticæ Reformatioribus, vel ad eos scriptæ*, &c. Tiguri, 1742, 8vo. 2. Her conference with Fleckenham. (Ballard). 3. A letter to Dr Harding, her father's chaplain. Printed in the Phoenix, vol. ii. p. 28. 4. A prayer for her own use during her confinement. In Fox's acts and monuments. 5. Four Latin verses; written in prison with a pin. They are as follow.

Non aliena putes, homini, quæ obtingere possint:
Sors hodierna mihi, tunc cito illa tibi.

Jane Dudley.

Deo juvante, nil nocet livor malus:
Et non juvante, nil juvat labor gravis.

Post tenebras spero lucem.

6. Her speech on the scaffold. (Ballard). It began thus: "My Lords, and you good Christian People who come to see me die; I am under a law, and by that law, as a never-ending judge, I am condemned to die: not for any thing I have offended the queen's majesty; for I will wash my hands guiltless thereof, and deliver to my God a soul as pure from such trespass as innocence from injustice; but only for that I consented to the thing I was enforced unto, constraint making the law believe I did that which I never understood," &c.—Hollinshed, Sir Richard Baker, Bale, and Fox, tell us that she wrote several other things, but do not mention where they are to be found.

GREY-Hound. See GRAY-Hound.

GRIBALDUS (Matthew), a learned civilian of Padua, left Italy in the 16th century, in order to make a public profession of the Protestant religion. After having been for some time professor of the civil law at Tübingen, he was obliged to make his escape to avoid the punishment he would have incurred had he been convicted of differing from Calvin with respect to the doctrine of the Trinity: but he was seized at Berne, where he would have met with very severe treatment had he not pretended to renounce his opinions; but as he relapsed again, he would certainly have been put to death, had he not died of the plague in 1664. He wrote *De methodo ac ratione studendi in jure civili*; and several other works which are esteemed.

GRIBNER (Michael Henry,) a learned civilian of Germany, was born at Leipzig in 1682. After writing some time in the journal of Leipzig, he was made professor of law at Wittemberg; whence he passed to Dresden, and was at last recalled to Leipzig to succeed M. Mencke. He died in 1734. Besides several academical dissertations, he wrote, 1. *Principia processus judicarii*; 2. *Principia jurisprudentiæ naturalis*, a small work much esteemed; 3. *Opuscula juris*

Grief *ris publici et privati.*

Grifgris.

GRIEF, or **SORROW**. The influence of this passion on the human mind is very great. It relaxes the solids, slackens the motion of the fluids, and destroys the health; it particularly weakens the stomach and intestines, destroying all appetite and desire for food. Opiates, if not given in large doses, are good cordials in this case.

GRIERSON (Constantia), born of poor parents in the county of Kilkenny in Ireland, was one of the most learned women on record, though she died at the age of 27, in 1733. She was an excellent Greek and Latin scholar; and understood history, divinity, philosophy, and mathematics. She proved her skill in Latin by her dedication of the Dublin edition of Tacitus to lord Carteret, and by that of Terence to his son; to whom she also addressed a Greek epigram. She wrote many elegant English poems, several of which were inserted by Mrs Barber among her own. When lord Carteret was lord lieutenant of Ireland, he obtained a patent for Mr Griereson to be the king's printer; and to reward the uncommon merit of his wife, caused her life to be included in it.

GRIFFON, in heraldry, an imaginary animal, feigned by the ancients to be half eagle and half lion. By this form they intended to give an idea of strength and swiftness joined, together with an extraordinary vigilance in guarding the things intrusted to its care. Thus the heathen naturalists persuaded the ignorant, that gold mines were guarded by these creatures with incredible watchfulness and resolution.

GRIMSBY, a large sea-port town of Lincolnshire in England, which had formerly a castle, and two parish-churches, with a commodious harbour, now almost choaked up. At present it has only one church, which is a large handsome structure like a cathedral. The town consists of several streets, whose houses are well built; and is a corporation, and sends two members to parliament. E. Long. o. 4. N. Lat. 53. 34.

GRINDING, the reducing hard substances to powder.

GRINDING Optic Glasses. See **OPTICS**, the *Mechanical Part*.

GRIPSWALD, a strong and considerable town of Pomerania in Germany; formerly imperial, but now subject to the Swedes, with a good harbour and university. E. long. 13. 53. N. lat. 54. 12.

GRISGRIS, a superstition greatly in vogue among the negroes in the interior parts of Africa. The grifgris, according to Le Maire, are certain Arabic characters mixed with magical figures drawn by the Marabuts or priests upon paper. Labat affirms, that they are nothing else than scraps of the alcoran in Arabic; but this is denied by Barbot, who brought over one of these grifgris to Europe, and shewed it to a number of persons deeply skilled in oriental learning. None of these could find the least trace of any character they understood. Yet, after all, this might be owing to the badness of the hand-writing; and the words are probably of the Mandingo language, though the characters are an attempt to imitate the Arabic. The poorest negro never goes to war without his Grifgris, as a charm against wounds; and if it proves ineffectual, the priest transfers the blame on the immorality

Grifgris.
Grifsons.

of his conduct. These priests invent grifgris against all kinds of dangers, and in favour of all desires and appetites; by virtue of which the possessors may obtain or avoid whatever they like or dislike. They defend them from storms, enemies, diseases, pains, and misfortunes; and preserve health, long life, wealth, honour, and merit, according to the Marabuts. No clergy in the world are more honoured and revered by the people, than these impostors are by the negroes; nor are any people in the world more impoverished by their priests than these negroes are, a grifgris being frequently fold at three slaves and four or five oxen. The grifgris intended for the head is made in the form of a cross, reaching from the forehead to the neck behind, and from ear to ear; nor are the arms and shoulders neglected. Sometimes they are planted in their bonnets in the form of horns; at other times, they are made like serpents, lizards, or some other animals, cut out of a kind of pasteboard, &c. There are not wanting Europeans, and otherwise intelligent seamen and merchants, who are in some degree infected with this weakness of the country, and believe that the negro forcerers have an actual communication with the devil, and that they are filled with the malignant influence of that evil spirit, when they see them distort their features and muscles, make horrid grimaces, and at last imitate all the appearance of epileptics.

GRISONS, a people situated among the Alps, and allies of the Swiss. Their country is bounded on the north by the counties of Surgans and Bludenz, the canton of Glaris, and the principality of Lichtenstein; on the south by the canton's Italian bailiwicks, the county of Chavanne, and the Valteline; on the east by the territories of Venice and Milan; and on the west by some of the Italian bailiwicks, and the canton of Uri. It is divided into three leagues, viz. the *Grifon* or *grey league*, the *league of the house of God*, and that of the *ten jurisdictions*. The two first lie towards the south, and the third towards the north. The length of the whole is above 70 miles, and the breadth about 60. The inhabitants are said to have had the name of *Grifons* from the grey coats they wore in former times. This country, lying among the Alps, is very mountainous; but the mountains yield good pasture for cattle, sheep, and goats, with some rye and barley: in the valleys there is plenty of grain, pulse, fruits, and wine. This country also abounds with hogs and wild-fowl; but there is a scarcity of fish and salt, and their horses are mostly purchased of foreigners. The principal rivers are the Rhine, the Inn, and the Adda. Here are also several lakes, most of which lie on the tops of the hills. The language of the Grifons is either a corrupt Italian, or the German. About two-thirds of the inhabitants are Calvinists, and the rest Papists; the latter of whom, in spirituals, are under the bishop of Coire, except a few that are in the diocese of Como. Each of the leagues is subdivided into several lesser communities, which are so many democracies; every male above 16 having a share in the government of the community, and a vote in the election of magistrates. Deputies from the several communities constitute the general diet of the Grifon leagues, which meets annually, and alternately at the capital of each league; but they can conclude nothing without the consent of their constituents.

Grifons
||
Groat.

constituents. This country was anciently a part of Rhetia. After the extinction of the Roman empire in the west, it was some time subject to its own dukes, or those of Swabia. Then the bishop of Coire, and other petty princes, dependent on the emperors of Germany, became masters of great part of it: at last, by the extinction of some, purchase, voluntary grants, and force, it got rid of all its lords, and erected itself into three distinct republics, each of which, as we observed already, is subdivided into a certain number of communities, which are a sort of republics, exercising every branch of sovereignty, except that of making peace or war, sending embassies, concluding alliances, and enacting laws relating to the whole country, which belong to the provincial diets of the several leagues. The communities may be compared to the cities of Holland, and the diets of the several leagues to the provincial states. The particular diets are composed of a deputy from each community; and both in them and the communities every thing is determined by a majority of votes. In the communities, every male above 16 has a vote. Besides the annual provincial diets for choosing the chiefs and other officers, and deliberating on the affairs of the respective leagues, there are general diets for what concerns all the three leagues, or whole body. In both these, the representatives can do nothing of themselves, but are tied down to the instructions of their principals: however, as all resolutions are decided by the plurality of votes, and as the Protestants are at least two-thirds of the people, this republic may be deemed a Protestant state. There is a general seal for all the three leagues; and each particular league has a separate seal. Besides the stated times of meeting, extraordinary diets are sometimes summoned, when either the domestic affairs of the state or any foreign minister require it. In the general diets, the Grey League has 28 votes; that of the House of God, 23; and that of the Ten Jurisdctions, 15. These leagues, at different times, have entered into close alliances with the neighbouring cantons, and their associates. The bailiwics belonging in common to the three leagues are those of the Val-teline, Chiavegne, Bormio, Meyenfeld, Malans, and Jennins; the officers of which are nominated successively by the several communities, every two years. The yearly revenue arising to the Grifons from their bailiwics is said to amount to about 13,500 florins. The public revenues all together are but small, though there are many private persons in the country that are rich. However, in case of any extraordinary emergency, they tax themselves in proportion to the necessity of the service, and the people's abilities. They have no regular troops, but a well-disciplined militia; and upon occasion, it is said, can bring a body of 30,000 fighting men into the field: but their chief security arises from the narrow passes and high mountains by which they are surrounded.

GRIST, in country affairs, denotes corn ground, or ready for grinding.

GROAT, an English money of account, equal to four pence. Other nations, as the Dutch, Poles, Saxons, Bohemians, French, &c. have likewise their groats, groots, grôches, gros, &c. In the Saxon times, no silver coin bigger than a penny was struck in England, nor after the conquest, till Edward III.

who, about the year 1351, coined groffes, i. e. *groats*, or great pieces, which went for 4d. a-piece; and so the matter stood till the reign of Henry VIII. who, in 1504, first coined shillings.

GROATS, in country affairs, oats for the hulls are off, or great oat-meal.

GROCERS, anciently were such persons as engrossed all merchandize that was vendible; but now they are incorporated, and make one of the companies of the city of London, which deals in sugar, foreign fruits, spices, &c.

GROENLAND, or SPITZBERGEN. See GREENLAND.

GROGRAM, a kind of stuff made of silk and mohair.

GROIN, that part of the belly next the thigh.—In the Philosophical Transactions we have an account of a remarkable case, where a peg of wood was extracted from the groin of a young woman of 21, after it had remained 16 years in the stomach and intestines, having been accidentally swallowed when she was about five years of age. *Vide Vol. LXVII. p. 459.*

GRONINGEN, the most northerly of the Seven United Provinces, is bounded on the north by the German ocean; on the south, by the county of Drenthe; on the east by the bishopric of Munster, and the principality of East-Friesland; and on the west by the province of Friesland, from which it is parted by the river Lauwers. Its greatest length from south-east to north-west is about 47 miles; but its breadth is very unequal, the greatest being about 33 miles. Here also are rich pastures, large herds of great and small cattle, plenty of sea and river fish, and of turf, with some forests and corn-land. There are several rivers in the province, of which the principal is the Hunte; and a great number of canals and dykes. The states consist of the deputies of the town of Groningen, and the Ommeland, or circumjacent country; and hold their assemblies always in the town of Groningen. The province had anciently governors, under the title of *burggraves*; but their power being limited, the people enjoyed great privileges. Afterwards, it became subject to the bishop of Utrecht; but shook off his yoke at last, and recovered its liberty. In 1536 it submitted to Charles V. and in 1579 acceded to the union of Utrecht. The colleges are much the same here as in the other provinces, viz. the provincial states, council of state, provincial tribunal, and chamber of accounts. Six deputies are sent from hence to the states-general. Of the established clergy there are 160 ministers, which form seven classes, whose annual synod is held, by turns, at Groningen and Appingedam.

GRONINGEN, the capital of the province of that name, is situated about 12 miles from the nearest shore of the German ocean, at the conflux of several rivulets, which form the Hunte and Fivel. Ships of considerable burthen can come up to the city, in consequence of which it enjoys a pretty good trade. It was formerly very strong, but its fortifications are now much neglected. The university here was founded in 1615, and is well endowed out of the revenues of the ancient monasteries. The town, which was formerly one of the Hanse, and has still great privileges, is large and populous, being the seat of the high colleges, and con-

Groats
||
Groninger

Gronovius
Grotius.

taining three spacious market-places, and 27 streets, in which are many fine houses, besides churches and other public structures. By the river Fivel, and the Eems, it has a communication with Westphalia. In 1672 it made such a gallant resistance against the bishop of Munster, that he is said to have lost ten thousand men before it. Rodolphus Agricola and Velsius, two of the most learned men of the age in which they lived, were born here. Under the jurisdiction of this city is a considerable district, called the *Corecht*. E. Lon. 6. 25. N. Lat. 53. 10.

GRONOVIVS (John Frederic), a very learned critic, was born at Hamburgh in 1613; and having travelled through Germany, Italy, and France, was made professor of polite learning at Deventer, and afterwards at Leyden, where he died in 1671. He published, 1. *Diatrise in Statii*, &c. 2. *De sefertitiis*. 3. Correct editions of Seneca, Statius, T. Livy, Pliny's Natural History, Tacitus, Aulus Gellius, Phædrus's Fables, &c. with notes; and other works.

GRONOVIVS (James), son of the preceding, and a very learned man, was educated first at Leyden, then went over to England, where he visited the universities, consulted the curious MSS. and formed an acquaintance with several learned men. He was chosen by the grand duke to be professor at Pisa, with a considerable stipend. He returned into Holland, after he had resided two years in Tuscany, and consulted the MSS. in the Medicean library. In 1679, he was invited by the curators of the university to a professorship; and his inaugural dissertation was so highly approved of, that the curators added 400 florins to his stipend, and this augmentation continued to his death in 1716. He refused several honourable and advantageous offers. His principal works are, *The treasure of Greek antiquities*, in 13 vols. folio; and a great number of dissertations, and editions of ancient authors. He was compared to Schioppus for the virulence of his style; and the severity with which he treated other great men who differed from him, exposed him to just censure.

GROOM, a name particularly applied to several superior officers belonging to the king's household, as groom of the chamber, groom of the stole. See *STOLE*, and *WARDROBE*.

GROOM is more particularly used for a servant appointed to attend on horses in the stable.—The word is formed from the Flemish *grom*, a boy.

GROOVE, among miners, is the shaft or pit sunk into the earth, sometimes in the vein, and sometimes not.

GROOVE, among joiners, the channel made by their plough in the edge of a moulding, style, or rail, to put their panels in, in wainscoting.

GROSS-BEAK, in ornithology; a species of *LOxia*. *GROSSULARIA*. See *RIPES*.

GROTESQUE, or GROTESK, in sculpture and painting, something whimsical, extravagant, and monstrous; consisting either of things that are merely imaginary, and have no existence in nature; or of things so distorted, as to raise surprise and ridicule.

GROTIUS (Hugo), or more properly *HUGO DE GROOT*, one of the greatest men in Europe, was born at Delft in 1583. He made so rapid a progress in his studies, that at the age of 15 he had attained a great know-

ledge in philosophy, divinity, and civil law; and a yet greater proficiency in polite literature, as appeared by the commentary he had made at that age on Martinius Capella. In 1598, he accompanied the Dutch ambassador into France, and was honoured with several marks of esteem by Henry IV. He took his degree of doctor of laws in that kingdom; and at his return to his native country, devoted himself to the bar, and pleaded before he was 17 years of age. He was not 24 when he was appointed attorney-general. In 1613 he settled in Rotterdam, and was nominated syndic of that city; but did not accept of the office, till a promise was made him, that he should not be removed from it. This prudent precaution he took from his foreseeing, that the quarrels of the divines on the doctrine of grace, which had already given rise to many factions in the state, would occasion revolutions in the chief cities. The same year he was sent into England, on account of the divisions that reigned between the traders of the two nations, on the right of fishing in the northern seas; but he could obtain no satisfaction. He was afterwards sent to England, as is it thought, to persuade the king and the principal divines to favour the Arminians; and he had several conferences with king James on that subject. On his return to Holland, his attachment to Barneveldt involved him in great trouble; for he was seized, and sentenced to perpetual imprisonment in 1619, and to forfeit all his goods and chattels. But after having been treated with great rigour for above a year and a half in his confinement, he was delivered by the advice and artifice of his wife, who having observed that his keepers had often fatigued themselves with searching and examining a great trunk-full of soul linen which used to be washed at Gorkum, but now let it pass without opening it, the advised him to bore holes in it to prevent his being stifled, and then to get into it. He complied with this advice, and was carried to a friend's house in Gorkum; where dressing himself like a mason, and taking a rule and trowel, he passed through the market-place, and stepping into a boat went to Valvec in Brabant. Here he made himself known to some Arminians, and hired a carriage to Antwerp. At first there was a design of prosecuting his wife, who staid in the prison; and some judges were of opinion that she ought to be kept there in her husband's stead: however, she was released by a plurality of voices, and universally applauded for her behaviour. He now retired into France, where he met with a gracious reception from that court, and Lewis XIII. settled a pension upon him. Having resided there eleven years, he returned to Holland, on his receiving a very kind letter from Frederic Henry, prince of Orange: but his enemies renewing their persecution, he went to Hamburgh; where, in 1634, queen Christina of Sweden made him her counsellor, and sent him ambassador into France. After having discharged the duties of this office above eleven years, he returned, in order to give an account to queen Christina of his embassy; when he took Holland in his way, and received many honours at Amsterdam. He was introduced to her Swedish majesty at Stockholm; and there begged that she would grant his dismissal, in order that he might return to Holland. This he obtained with difficulty; and the queen gave him many

Grotto
Grotto.

marks of her esteem, though he had many enemies at this court. As he was returning, the ship in which he embarked was cast away on the coast of Pomerania; and being now sick, he continued his journey by land; but was forced to stop at Rostock, where he died, on the 28th of August 1645. His body was carried to Delft, to be interred in the sepulchre of his ancestors. Notwithstanding the embassies in which he was employed, he composed a great number of excellent works; the principal of which are, 1. A treatise *De jure belli et pacis*, which is esteemed a master-piece. 2. A treatise on the truth of the Christian religion. 3. Commentaries on the holy scriptures. 4. The history and annals of Holland. 5. A great number of letters. All which are written in Latin.

GROTSCHAW, a town of Turkey in Europe, in the province of Servia, where a battle was fought between the Germans and Turks, in the year 1739, in which the Germans were forced to retreat with loss. E. Lon. 21. O. N. Lat. 45. o.

GROTSKAU, a strong town of Germany, capital of a province of the same name in Silesia. It is very agreeably seated, in a fruitful plain. E. Lon. 17. 35. N. Lat. 50. 42.

GROTTO, a large deep cavern or den in a mountain or rock.

Of these there are several remarkable ones in different parts of the world†. The most celebrated one of our own country, is that called *Oakley-hole*, on the fourth side of Mendip hills. Its length is about two hundred yards, and its height various; being in some places very low, and in others eight fathoms.

Grotto is also used for a small artificial edifice made in a garden, in imitation of a natural grotto.

The outides of these grottos are usually adorned with rustic architecture, and their inside with shell-work, coral, &c. and also furnished with various fountains and other ornaments.

GROTTA del Cani, a little cavern near Pozzuoli, four leagues from Naples, the steams whereof are of a mephitic or noxious quality; whence also it is called *bocca venenosa*, the poisonous mouth.

"Two miles from Naples, says Dr Mead, just by the Lago de Agnano, is a celebrated mofeta, commonly called the *Grotta del Cani*, equally destructive to all within the reach of its vapours.

"It is a small grotto about eight feet high, twelve long, and six broad; from the ground arises a thin, subtle, warm fume, visible enough to a discerning eye, which does not spring up in little parcels here and there, but in one continued stream, covering the whole surface of the bottom of the cave: having this remarkable difference from common vapours, that it does not, like smoke, disperse itself into the air, but quickly after its rise falls back again, and returns to the earth, the colour of the sides of the grotto being the measure of its ascent; for so far it is of a darkish green, but higher only common earth. And as I myself found no inconvenience by standing in it, so no animal, if its head be above this mark, is the least injured. But when, as the manner is, a dog, or any other creature, is forcibly kept below it, or by reason of its smallness cannot hold its head above it, it presently loses all motion, falls down as dead or in

a swoon, the limbs convulsed and trembling, till at last no more signs of life appear, than a very weak and almost insensible beating of the head and arteries; which, if the animal be left a little longer, quickly ceases too, and then the case is irrecoverable; but if snatched out, and laid in the open air, soon comes to life again, and sooner if thrown into the adjacent lake."

"The fumes of the grotto, the same author argues, are no real poison, but act chiefly by their gravity; else the creatures could not recover so soon; or if they did, some symptoms, as faintness, &c. would be the consequence of it. He adds, that in creatures killed therewith, when dissected, no marks of infection appear; and that the attack proceeds from a want of air, by which the circulation tends to an entire stoppage, and this so much the more, as the animal inspires a fluid of a quite different nature from the air, and so nowise fit to supply its place.

"Taking the animal out while alive, and throwing it into the neighbouring lake, it recovers. This is owing to the coldness of the water, which promotes the contraction of the fibres, and so assists the retarded circulation. The small portion of the air which remains in the vesiculae, after every expiration, may be sufficient to drive out the noxious fluid. After the same manner, cold water acts in a deliquium animi: the lake of Agnano has no other virtue in it more than others."

The steam arising in this grotto was for a long time reckoned to be of a poisonous nature, and thought to suffocate the animals which breathed it. Dr Hales imagined that it destroyed the elasticity of the air, caused the vesicles of the lungs to collapse, and thus occasioned sudden death.—It is now, however, found that this steam is nothing else than fixed air, which from time immemorial hath issued out of the earth in that place in very great quantity, the causes of which cannot yet be investigated from any of the modern discoveries concerning that species of air. It proves pernicious when breathed in too great quantity, by rarefying the blood too much; and hence the best method of recovering persons apparently killed by fixed air, is to apply a great degree of cold all over their bodies, in order to condense the blood as much as possible. This is the reason why the dogs recover when thrown into the lake Agnano, as above-mentioned. See the articles BLOOD, DAMPS, and (the Index subjoined to) MEDICINE.

GROTTA del Serpi, is a subterraneous cavern near the village of Sassa, eight miles from the city of Bracciano in Italy, described by Kircher thus:

"The grotto del serpi is big enough to hold two persons. It is perforated with several stiltular apertures, somewhat in manner of a sieve; out of which, at the beginning of the spring season, issues a numerous brood of young snakes of divers colours, but all free from any particularly poisonous quality.

"In this cave they expose their lepers, paralytics, arthritics, and elephantiac patients, quite naked; where, the warmth of the subterraneous steams resolving them into a sweat, and the serpents clinging variously all around, licking and sucking them, they become so thoroughly freed of all their vicious humours, that, upon repeating the operation for some time,

Grotto.

† See
Antiperiod.

time, they become perfectly restored."

This cave Kircher visited himself; and found it warm, and every way agreeable to the description given of it. He saw the holes, and heard a murmuring hissing noise in them. Though he missed seeing the serpents, it not being the season of their creeping out; yet he saw a great number of their exuviae, or sloughs, and an elm growing hard by laden with them.

Museum
Worm.

The discovery of this cave, was by the cure of a leper going from Rome to some baths near this place. Losing his way, and being benighted, he happened upon this cave. Finding it very warm, he pulled off his clothes; and being weary and sleepy, had the good fortune not to feel the serpents about him till they had wrought his cure.

GROVE, in gardening, a small wood impervious to the rays of the sun.

Groves are not only great ornaments to gardens; but are also the greatest relief against the violent heats of the sun, affording shade to walk under in the hottest parts of the day, when the other parts of the garden are useless; so that every garden is defective which has not shade.

Groves are of two sorts, viz. either open or close. Open groves are such as have large shady trees, which stand at such distances, as that their branches approach so near to each other as to prevent the rays of the sun from penetrating through them.

Close groves have frequently large trees standing in them; but the ground under these are filled with shrubs or underwood; so that the walks which are in them are private, and screened from winds; by which means they are rendered agreeable for walking, at those times when the air is either too hot or too cold in the more exposed parts of the garden. These are often contrived for as to bound the open groves, and frequently to hide the walls or other inclosures of the garden: and when they are properly laid out, with dry walks winding through them, and on the sides of these sweet-smelling shrubs and flowers irregularly planted, they have a charming effect.

GROVE (Henry), a learned and ingenious Presbyterian divine, was born at Taunton in Somersetshire, in 1683. Having obtained a sufficient stock of classical literature, he went through a course of academical learning, under the reverend Mr Warren of Taunton, who had a flourishing academy. He then removed to London, and studied some time under the Reverend Mr Rowe, to whom he was nearly related. Here he contracted a friendship with several persons of merit, and particularly with Dr Watts, which continued till his death, though they were of different opinions in several points warmly controverted among divines. After two years spent under Mr Rowe, he returned into the country, and began to preach with great reputation; when an exact judgment, a lively imagination, and a rational and amiable representation of Christianity, delivered in a sweet and well-governed voice, rendered him generally admired; and the spirit of devotion, which prevailed in his sermons, procured him the esteem and friendship of Mrs Singer, afterwards Mrs Rowe, which she expressed in a fine ode on death, addressed to Mr Grove. Soon after his beginning to preach, he married; and on the death of Mr Warren,

was chosen to succeed him in the academy at Taunton.

This obliging him to reside there, he preached for eighteen years to two small congregations in the neighbourhood; and though his salary from both was less than twenty pounds a-year, and he had a growing family, he went through it cheerfully. In 1708, he published a piece, intitled *The regulation of diversions*, drawn up for the use of his pupils. About the same time, he entered into a private dispute by letter with Dr Samuel Clarke: but they not being able to convince each other, the debate was dropped with expressions of great mutual esteem. He next wrote several papers printed in the *Spectator*, viz. Numb. 588. 601. 626. 635. The last was republished, by the direction of Dr Gibson bishop of London, in the *Evidence of the Christian Religion*, by Joseph Addison, Esq. In 1725, Mr James, his partner in the academy, dying, he succeeded him in his pastoral charge at Fulwood, near Taunton, and engaged his nephew to undertake the other parts of Mr James's work as tutor; and in this situation Mr Grove continued till his death, which happened in 1738. His great concern with his pupils, was to inspire and cherish in them a prevailing love of truth, virtue, liberty, and genuine religion, without violent attachments or prejudices in favour of any party of Christians. He represented truth and virtue in a most engaging light; and though his income, both as a tutor and a minister, was insufficient to support his family, without breaking into his paternal estate, he knew not how to refuse the call of charity. Besides the above pieces, he wrote, 1. An essay towards a demonstration of the soul's immortality. 2. An essay on the terms of Christian communion. 3. The evidence of our Saviour's resurrection considered. 4. Some thoughts concerning the proof of a future state from reason. 5. A discourse concerning the nature and design of the Lord's supper. 6. Wisdom the first spring of action in the Deity. 7. A discourse on saving faith. 8. Miscellanies in prose and verse. 9. Many sermons, &c. After his decease, his posthumous works were published by subscription, in four volumes octavo, with the names of near 700 subscribers, among whom were some of the best judges of merit in the established church.

GROUND, in painting, the surface upon which the figures and other objects are represented.

The ground is properly understood of such parts of the piece, as have nothing painted on them, but retain the original colour upon which the other colours are applied to make the representations.

A building is said to serve as a ground to a figure, when the figure is painted on the building.

The ground behind a picture in miniature, is commonly blue or crimson, imitating a curtain of satin or velvet.

GROUND, in etching, denotes a guminous composition smeared over the surface of the metal to be etched, to prevent the aquafortis from eating, except in such places where this ground is cut through with the point of a needle. See the article *ETCHING*.

GROUND-*Angling*, fishing under water without a float, only with a plumb of lead, or a bullet, placed about nine inches from the hook; which is better, because it will roll on the ground. This method of fishing.

Ground || ing is most proper in cold weather, when the fish swim very low. Growth.

The morning and evening are the chief seasons for the ground-line in fishing for trout; but if the day prove cloudy, or the water muddy, you may fish at ground all day.

GROUND-TACKLE, a ship's anchors, cables, &c. and in general whatever is necessary to make her ride safe at anchor.

GROUND-IVY, in botany. See **GLECHOMA**.

GROUND-PINE, in botany. See **TEUCRIUM**.

GROUNDSEL. See **SENECIO**.

GROUP, in painting and sculpture, is an assemblage of two or more figures of men, beasts, fruits, or the like, which have some apparent relation to each other. See **PAINTING**.—The word is formed of the Italian *gruppo*, a knot.

The Groups, a cluster of islands lately discovered in the south sea. They lie in about S. Lat. 18. 12. and W. Lon. 142. 42. They are long narrow slips of land, ranging in all directions, some of them ten miles or upwards in length, but not more than a quarter of a mile broad. They abound in trees, particularly those of the cocoa-nut. They are inhabited by well-made people, of a brown complexion. Most of them carried in their hands a slender pole about 14 feet in length, pointed like a spear; they had likewise something shaped like a paddle, about four feet long. Their canoes were of different sizes, carrying from three to six or seven people, and some of them hoisted a sail.

GROUSE, or **GROUSE**. See **TETRAO**.

GROWTH, the gradual increase of bulk and stature that takes place, in animals or vegetables, to a certain period.—The increase of bulk in such bodies as have no life, owing to fermentations excited in their substance, or to other causes, is called **EXPANSION**, **SWELLING**, &c.

The growth of animals, nay even of the human species, is subject to great variations. A remarkable instance in the last was observed in France in the year 1729. At this time the Academy of Sciences examined a boy who was then only seven years old, and who measured four feet eight inches and four lines high, without his shoes. His mother observed the signs of puberty on him at two years old, which continued to increase very quick, and soon arrived at the usual standard. At four years old he was able to lift and toss the common bundles of hay in stables into the horses racks; and at six years old could lift as much as a sturdy fellow of twenty. But though he thus increased in bodily strength, his understanding was no greater than is usual with children of his age, and their playthings were also his favourite amusements.

Another boy, a native of the hamlet of Bouzanquet, in the diocese of Alais, though of a strong constitution, appeared to be knit and stiff in his joints till he was about four years and a half old. During this time nothing farther was remarkable of him than an extraordinary appetite, which was satisfied no otherwise than by giving him plenty of the common aliments of the inhabitants of the country, consisting of rye-bread, chefnuts, bacon, and water; but his limbs soon becoming supple and pliable, and his body beginning to expand itself, he grew up in so extraor-

dinary a manner, that at the age of five years he measured four feet three inches; some months after, he was four feet eleven inches; and at six, five feet, and bulky in proportion. His growth was so rapid, that one might fancy he saw him grow: every month his cloaths required to be made longer and wider; and what was still very extraordinary in his growth, it was not preceded by any tickle, nor accompanied with any pain in the groin or elsewhere. At the age of five years his voice changed, his beard began to appear, and at six he had as much as a man of thirty; in short, all the unquestionable marks of puberty were visible in him. It was not doubted in the country but this child was, at five years old, or five and a half, in a condition of begetting other children; which induced the rector of the parish to recommend to his mother that she would keep him from too familiar a conversation with children of the other sex. Tho' his wit was ripier than is commonly observable at the age of five or six years, yet its progress was not in proportion to that of his body. His air and manner still retained something childish, though by his bulk and stature he resembled a complete man, which at first sight produced a very singular contrast. His voice was strong and manly, and his great strength rendered him already fit for the labours of the country. At the age of five years, he could carry to a good distance, three measures of rye, weighing eighty-four pounds; when turned of six, he could lift up easily on his shoulders and carry loads of a hundred and fifty pounds weight a good way off; and these exercises were exhibited by him as often as the curious engaged him thereto by some liberality. Such beginnings made people think that he would soon shoot up into a giant. A mountebank was already soliciting his parents for him, and flattering them with hopes of putting him in a way of making a great fortune. But all these hopes suddenly vanished. His legs became crooked, his body shrank, his strength diminished, his voice grew sensibly weaker, and he at last sunk into a total imbecility.

In the Paris Memoirs also there is an account of a girl who had her menses at three months of age. When four years old, she was four feet six inches in height, and had her limbs well proportioned to that height, her breasts large and plump, and the parts of generation like those of a girl of eighteen; so that there is no doubt but that she was marriageable at that time, and capable of being a mother of children. These things are more singular and marvellous in the northern than in the southern climates, where the females come sooner to maturity. In some places of the East Indies, the girls have children at nine years of age.

Many other instances of extraordinary growth might be brought, but the particulars are not remarkably different from those already related.—It is at first sight astonishing that children of such early and prodigious growth do not become giants: but when we consider that the signs of puberty appear so much sooner than they ought, it seems evident that the whole is only a more than usually rapid expansion of the parts, as in hot climates; and accordingly it is observed that such children, instead of becoming giants, always decay and die apparently of old age, long before the natu-

ral term of human life.

GRUB, in zoology, the English name of the hexapode worms, produced from the eggs of beetles, and which at length are transformed into winged insects of the same species with their parents.

GRUBBING, in agriculture, the digging or pulling up of the stubs and roots of trees.

When the roots are large, this is a very troublesome and laborious task; but Mr Mortimer hath shewn how it may be accomplished in such a manner as to save great expence by a very simple and easy method. He proposes a strong iron hook to be made about two feet four inches long, with a large iron ring fastened to the upper part of it. This hook must be put into a hole in the side of the root, to which it must be fastened; and a lever being put into the ring, three men, by means of this lever, may wring out the root, and twist the sap-roots asunder. Stubs of trees may also be taken up with the same hook, in which work it will save a great deal of labour, though not so much as in the other; because the stubs must be first cleft with wedges, before the hook can enter the sides of them, to wrench them out by pieces.

GRUBENHAGEN, a town and castle of the duchy of Brunswick, in Lower Saxony, remarkable for its mines of silver, copper, iron, and lead. E. Lon. 9. 36. N. Lat. 51. 45.

GRUBS, in medicine, certain unctuous pimples arising in different parts of the face, but chiefly in the aleæ of the nose. The cure of these ought only to be attempted by evacuations and cleansers of the blood.

GRUINALES, (from *grus*, a crane); the name of the fourteenth order in Linnaeus's fragments of a natural method, consisting of geranium, and a few other genera which the author considers as allied to it in their habit and external structure.

GRUME, in medicine, denotes a concentered clot of blood, milk, or other substance. Hence grumous blood is that which approaches to the nature of grume, and by its viscosity and stagnating in the capillary vessels produces several disorders.

GRUPPO, or *Turned SHAKE*, a musical grace, defined by Playford to consist in the alternate prolation of two notes in juxtaposition to each other, with a clofe on the note immediately beneath the lower of them. See *SHAKE*.

GRUS, in ornithology. See *ARDEA*.

GRUTER (James), a learned philologist, and one of the most laborious writers of his time, was born at Antwerp in 1560. He was but a child, when his father and mother, being persecuted for the Protestant religion by the dukes of Parma governors of the Netherlands, carried him into England. He imbibed the elements of learning from his mother, who was one of the most learned women of the age, and besides French, Italian, and English, was a complete mistress of Latin, and well skilled in Greek. He spent some years in the university of Cambridge; after which he went to that of Leyden, to study the civil law; but at last applied himself wholly to polite literature. After travelling much, he became professor in the university of Heidelberg; near which city

he died, in 1627. He wrote many works; the most considerable of which are, 1. A large collection of ancient inscriptions. 2. *Thefaurus criticus*. 3. *Deliciae poetarum Gallorum, Italorum, et Belgarum, &c.*

GRUYERS, a town of Switzerland, in the canton of Friburgh, with a pretty good castle. It is famous for its cheese, which are all its riches. E. Lon. 7. 23. N. Lat. 46. 35.

GRYLLUS, in zoology, the name of the cricket and locust kind; which, together with the grasshoppers, make only one genus of insects, belonging to the order of hemiptera. The characters are these: The antennæ are setaceous and filiform; the exterior wings are membranaceous, narrow, and have much of the appearance of the wings of some of the fly-kind; the thorax is compressed and angulated; and the legs are formed for leaping. See Plate CXV. CXL. and the articles GRASSHOPPER, GRYLLOTALPA, LOCUST, (and CRICKET in Appendix.)

GRYLLOTALPA, the MOLE-CRICKET; an insect very destructive to gardens. Like the cricket, it makes a noise in the evening; and like the mole, is perpetually employed in digging below ground. It is an insect of a very unpleasant form. It is of the length and thickness of a man's little finger; and is of a brown colour, which is darker in the male than in the female. There are on each side of the anus two hairy processes, resembling the tails of mice; its belly is composed of eight joints, and is covered with as many scales, which are of a pale flesh-colour, and are covered with short hair. The back is covered by a pair of pointed wings, along each of which there runs a black streak or line. These wings fold any way at the creature's pleasure, and when fully expanded are very large. Over these lie the antennæ; which are variegated also with black, and reach about half the length of the wings. It has only four legs: the hinder pair are long and fit for hopping; the anterior pair are short, and furnished with a sort of hands for digging in the manner of the mole. The breast is covered with a crustaceous substance, which is blackish and hairy on the outside, and smooth and pale within. The eyes are very bright and black, and are very hard; and the mouth is wide, and has two tonsils, and teeth in both jaws. This creature lives under ground, and is principally found in damp and boggy places. They come out in the dusk of the evening, and make a very loud noise of the nature of that of the cricket.

The mole-cricket moves very slowly: and Goedartius is of opinion, that its wings were given it rather as an ornament, than as a thing of use; or if they have any real use, that it is the covering and defending the tender body of the creature, which is very soft, and easily liable to accidents; and Mousset says, that its flights are no more than long leaps. But we have a very different account of the use this creature makes of its wings, in the German Ephemerides. Mentzelius, in a paper there, declares this to be one of the most mischievous insects of the creation. He says it is a kind of amphibious creature; and that it lives equally well under ground, in the air, or under water: that while it is under ground, it does infinite mischief, by burrowing under the beds of a garden, and eating the roots of flowers; and that in the night

Gryllotalpa it comes out, and taking wing, settles upon the fruit-trees, where it does no little mischief: and all this the author affirms from his own experience, in the gardens which he observed.

This creature is very nice in the construction of its nest. This is always under ground, and it chooses a foetid clay for the purpose. All its precautions seem to be necessary to secure its eggs from becoming a prey to a kind of black fly, which conceals itself under ground. The noise of this animal is variously accounted for by naturalists; but it is most probably effected by the play of organs in their belly, of a singular construction. This is certain, that if the head of the animal be taken off, or if it be severed in the middle, it continues to live, and even to chirp, for some considerable time.

It is remarkable of this creature, that it can move backward as fast as forward, and often does so when frightened.

GRYNEUS (Simon), son to a peasant of Suabia, born in 1493, was Greek professor at Heidelberg, in 1523. He took a tour into England, and received great civility from the lord chancellor Sir Thomas More, to whom Erasmus had recommended him. He was a learned and laborious man, and did great service to the commonwealth of letters. He was the first who published the *Almagest* of Ptolemy in Greek. He also published a Greek Euclid, and Plato's works, with some commentaries of Proclus.

GRYPHIUS (Sebastian), an eminent Swiss printer, and accurate corrector; on which account his Hebrew and Latin Bibles are esteemed. He died in 1556.

GRYPHITES, in natural history, in English crow's stone, an oblong fossil shell, very narrow at the head, and becoming gradually wider to the extremity, where it ends in a circular limb; the head or beak of this is very hooked or bent inward.

They are frequently found in our gravel or clays, in many counties. There are three or four distinct species of them; some are extremely rounded and convex on the back, others less so; and the plates of which they are composed, are in some smaller and thinner, in others thicker and larger, in specimens of the same bigness.

GUADALAJARA, or GUADALAXARA, a town of Spain, in New Castile, and district of Alcalá, seated on the river Herases, W. Lon. 2. 45. N. Lat. 40. 36.

GUADALAJARA, a considerable town of North America, and capital of a rich and fertile province of the same name, with a bishop's see. W. Lon. 114. 59. N. Lat. 20. 20.

GUADALAVIAR, a river of Spain, which rises on the confines of Arragon and New Castile, and, running by Turvel in Arragon, crosses the kingdom of Valencia, passes by the town of the same name, and soon after falls into the Mediterranean sea, a little below Valencia.

GUADALUPE, a handsome town in Spain, in Estramadura, with a celebrated convent, whose structure is magnificent, and is immensely rich. It is seated on a rivulet of the same name. E. Lon. 3. 50. N. Lat. 39. 15.

GUADALQUIVER, one of the most famous rivers of Spain, rises in Andalusia, near the confines of Granada, and running quite through Andalusia, by

the towns of Baiza, Andaxar, Cordova, Seville, and Guadalupe, St. Lucar, falls at last into the Bay of Cadiz.

GUADALUPE, one of the Caribbee islands, belonging to the French, the middle of which is seated in about 16. 30. N. Lat. and 61. 20. W. Lon.

This island, which is of an irregular figure, may be about 80 leagues in circumference. It is divided into two parts by a small arm of the sea, which is not above two leagues long, and from 15 to 40 fathom broad. This canal, known by the name of the Salt River, is navigable, but will only carry vessels of 50 tons burthen.

That part of the island which gives its name to the whole colony, is, towards the centre, full of craggy rocks, where the cold is so intense, that nothing will grow upon them but fern, and some useless shrubs covered with moss. On the top of these rocks, a mountain called *la Souphriere*, or the *Brimstone Mountain*, rises to an immense height. It exhales, through various openings, a thick black smoke, intermixed with sparks that are visible by night. From all these hills flow numberless springs, which fertilize the plains below, and moderate the burning heat of the climate by a refreshing stream, so celebrated, that the galleons which formerly used to touch at the Windward Islands, had orders to renew their provision with this pure and salubrious water. Such is that part of the island properly called *Guadalupe*. That which is commonly called *Grand Terre*, has not been so much favoured by nature. It is indeed less rugged; but it wants springs and rivers. The soil is not so fertile, or the climate so wholesome or so pleasant.

No European nation had yet taken possession of this island, when 550 Frenchmen, led on by two gentlemen named *Loline* and *Duplestis*, arrived there from Dieppe on the 28th of June 1635. They had been very imprudent in their preparations. Their provisions were so ill chosen, that they were spoilt in the passage; and they had shipped so few, that they were exhausted in two months. They were supplied with none from the mother-country. St. Christopher's, whether from scarcity or design, refused to spare them any; and the first attempts in husbandry they made in the country, could not as yet afford any thing. No resource was left for the colony but from the savages; but the superfluities of a people, who cultivate but little, and therefore had never laid up any stores, could not be very considerable. The new comers, not content with what the savages might freely and voluntarily bring, came to a resolution to plunder them; and hostilities commenced on the 16th of January 1636.

The Caribs, not thinking themselves in a condition openly to resist an enemy who had so much the advantage from the superiority of their arms, destroyed their own provisions and plantations, and retired to Grand Terre, or to the neighbouring islands. From thence the most desperate came over to the island from which they had been driven, and concealed themselves in the thickest parts of the forests. In the day-time, they shot with their poisoned arrows, or knocked down with their clubs, all the Frenchmen who were scattered about for hunting or fishing. In the night, they burned the houses and destroyed the plantations of their unjust spoilers.

A dreadful famine was the consequence of this kind of war. The colonists were reduced to graze in the fields,

Fig. 1. GLASS MAKERS at work.



Fig. 2. Cutting and Running of PLATE GLASS.



Fig. 3.

Grinding and Polishing of PLATE GLASS.



GEYL'S or LOCUST

*Fig. 4. Cristatus.
By the hair.*



*Fig. 5.
Migratorius.*



*Fig. 6.
Common Locust.*

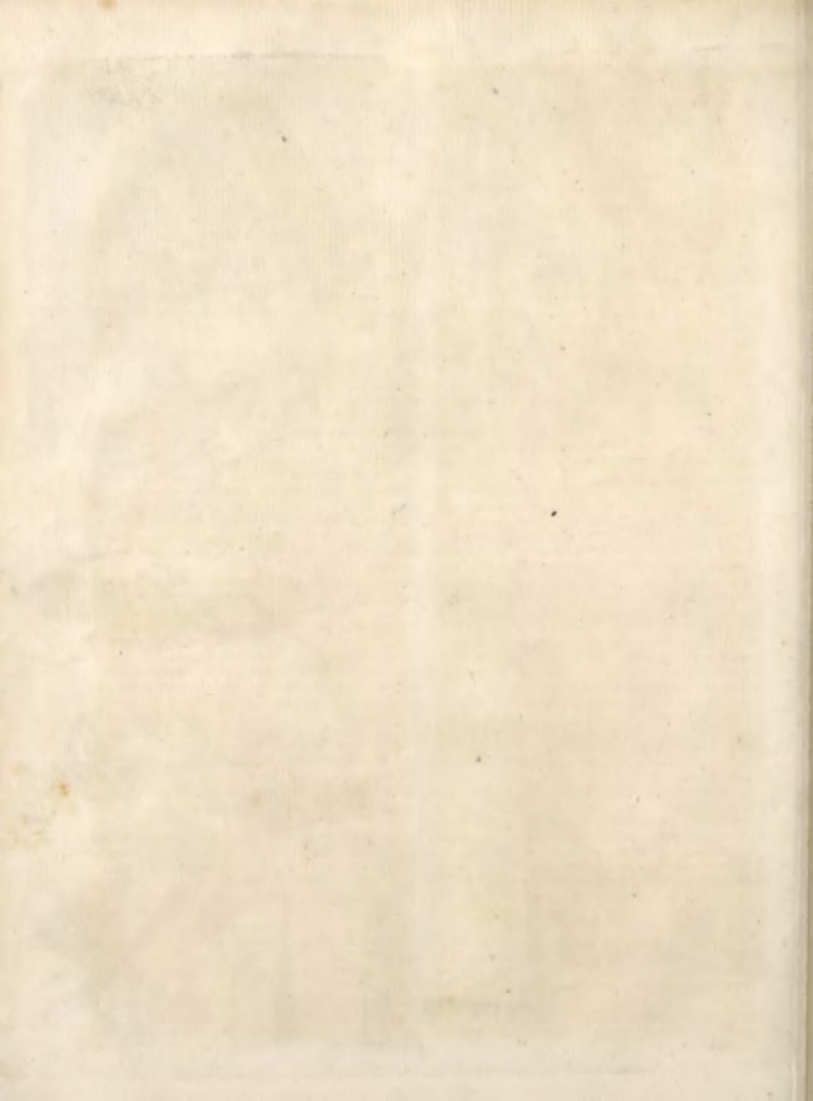


*Fig. 7.
Carolinensis.*



Fig. 8. GIGANTUM.





Guadalupe. fields, to eat their own excrements, and to dig up dead bodies for their subsistence. Many who had been slaves at Algiers, held in abhorrence the hands that had broken their fetters; and all of them cursed their existence. It was in this manner that they atoned for the crime of their invasion, till the government of Aubert brought a peace with the savages at the end of the year 1640. The remembrance, however, of hardships endured in an invaded island, proved a powerful incitement to the cultivation of all articles of immediate necessity; which afterwards induced an attention to those of luxury consumed in the mother-country. The few inhabitants who had escaped the calamities they had drawn upon themselves, were soon joined by some discontented colonists from St Christopher's, by Europeans fond of novelty, by sailors tired of navigation, and by some sea-captains, who prudently chose to commit to the care of a grateful soil the treasures they had saved from the dangers of the sea. But still the prosperity of Guadalupe was stopped or impeded by obstacles arising from its situation.

The facility with which the pirates from the neighbouring islands could carry off their cattle, their slaves, their very crops, frequently brought them into a desperate situation. Intelline broils, arising from jealousies of authority, often disturbed the quiet of the planters. The adventurers who went over to the windward islands, disdaining a land that was fitter for agriculture than for naval expeditions, were easily drawn to Martinico, by the convenient roads it abounds with. The protection of those intrepid pirates, brought to that island all the traders who flattered themselves that they might buy up the spoils of the enemy at a low price, and all the planters who thought they might safely give themselves up to peaceful labours. This quick population could not fail of introducing the civil and military government of the Caribbee islands into Martinico. From that time, the French ministry attended more seriously to this than to the other colonies, which were not so immediately under their direction; and, hearing chiefly of this island, they turned all their encouragements that way.

It was in consequence of this preference, that in 1700 the number of inhabitants in Guadalupe amounted only to 3825 white people, 325 savages, free negroes, mulattoes, and 6725 slaves, many of whom were Caribs. Her cultures were reduced to 60 small plantations of sugar, 66 of indigo, a little cocoa, and a considerable quantity of cotton. The cattle amounted to 1620 horses and mules, and 3699 head of horned cattle. This was the fruit of sixty years labour. But her future progress was as rapid as her first attempts had been slow.

At the end of the year 1755, the colony was peopled with 9,643 whites, 41,140 slaves of all ages and of both sexes. Her saleable commodities were the produce of 334 sugar-plantations, 15 plots of indigo, 46840 items of cocoa, 11700 of tobacco, 2,257,725 of coffee, 12,748,447 of cotton. For her provisions she had 29 squares of rice or maize, and 1219 of potatoes or yams, 2,028,520 banana trees, and 32,577,950 trenches of cassava. The cattle of Guadalupe consisted of 4946 horses, 2924 mules, 125 asses, 13,716 head of horned cattle, 11,162 sheep or goats, 2444 hogs. Such was the state of Guadalupe

Vol. V.

when it was conquered by the British in the month of April 1759.

France lamented this loss; but the colony had reason to comfort themselves for this disgrace. During a siege of three months, they had seen their plantations destroyed, the buildings that served to carry on their works burnt down, and some of their slaves carried off. Had the enemy been forced to retreat after all these devastations, the island was ruined. Deprived of all assistance from the mother-country, which was not able to send her any succours; and expecting nothing from the Dutch, (who, on account of their neutrality, came into her roads), because she had nothing to offer them in exchange; she could never have subsisted till the ensuing harvest.

The conquerors delivered them from these apprehensions. The British, indeed, are no merchants in their colonies. The proprietors of lands, who mostly reside in Europe, send to their representatives whatever they want, and draw the whole produce of the estate by the return of their ship. An agent settled in some sea-port of Great Britain, is intrusted with the furnishing the plantation, and receiving the produce. This was impracticable at Guadalupe; and the conquerors in this respect were obliged to adopt the custom of the conquered. The British, informed of the advantage the French made of their trade with the colonies, hastened, in imitation of them, to send their ships to the conquered island; and so multiplied their expeditions, that they overstocked the market, and sunk the price of all European commodities. The colonists bought them at a very low price, and, in consequence of this plenty, obtained long delays for the payment.

To this credit, which was necessary, was soon added another arising from speculation, which enabled the colony to fulfil its engagements. A great number of negroes were carried thither, to hasten the growth and enhance the value of the plantations. It has been said in various memorials, all copied from each other, that the English had stocked Guadalupe with 30,000, during the four years and three months that they remained masters of the island. The registers of the custom-houses, which may be depended on, as there could be no inducement for an imposition, attest that the number was no more than 18,721. This was sufficient to give the nation well-grounded hopes of reaping great advantages from their new conquest. But their hopes were frustrated; and the colony, with its dependencies, was restored to its former possessors, by the treaty of peace in July 1763.

By the survey taken in 1767, this island, including the smaller islands, Defeada, St Bartholomew, Mari-galante, and the Saints, dependent upon it, contains 11,863 white people of all ages, and of both sexes; 752 free blacks and mulattos; 72,761 slaves; which makes in all a population of 85,376 souls. The cattle consists of 5060 horses, 4854 mules, 111 asses, 17,378 head of horned cattle, 14,895 sheep or goats, and 2669 hogs. The provision is 30,476,218 trenches of cassava, 2,819,262 banana trees, 2118 squares of land planted with yams and potatoes. The plantations contain 72 arnotto trees, 327 of cassia, 13,292 of cocoa, 5,881,176 of coffee, 12,156,769 of cotton, 21,474 squares of land planted with sugar-canes.

19 P.

The

Guadiana
||
Guañacum.

The woods occupy 22,097 squares of land. There are 20,247 in meadows, and 6405 are uncultivated or forsaken. Only 1582 plantations grow cotton, coffee, and provisions. Sugar is made but in 401. These sugar-works employ 140 water-mills, 263 turned by oxen, and 11 wind-mills.

The produce of Guadalupe, including what is poured in from the small islands under her dominion, ought to be very considerable. But in 1768, it yielded to the mother-country no more than 140,418 quintals of fine sugar, 23,603 quintals of raw sugar, 34,205 quintals of coffee, 11,955 quintals of cotton, 456 quintals of cocoa, 1884 quintals of ginger, 2529 quintals of logwood, 24 chests of sweetmeats, 165 chests of liquors, 34 casks of rum, and 1202 undressed skins. All these commodities were sold in the colony only for 310,792 l. 18 s. 3 d. and the merchandise it has received from France has cost but 197,919 l. 18 s. 6 d.

GUADIANA, a large river of Spain, having its source in New Castile, and, passing cross the high mountains, falls down to the lakes called *Ojas of Guadiana*; from whence it runs to Calatrava, Medellin, Merida, and Badajoz in Eltremaadura of Spain; and after having run for some time in Alentejo in Portugal, it passes on to separate the kingdom of Algarve from Andalusia, and falls into the bay or gulph of Cadiz between Castro Marino and Agramonte.

GUADIX, a town of Spain, in the kingdom of Granada, with a bishop's see. It was taken from the Moors in 1253, who afterwards retook it, but the Spaniards again got possession of it in 1489. It is seated in a fertile country, in W. Long. 2. 12. N. Lat. 37. 5.

GUAJACUM, *LIGNUM VITÆ*, or *Pockwood*; a genus of the monogynia order, belonging to the decandria class of plants.

Species. 1. The officinale, or common *lignum vitæ* used in medicine, is a native of the West India islands. There it becomes a large tree, having a hard, brittle, brownish bark, not very thick. The wood is firm, solid, ponderous, very resinous, of a blackish yellow colour in the middle, and of a hot aromatic taste. The smaller branches have an ash-coloured bark, and are garnished with leaves divided by pairs of a bright green colour. The flowers are produced in clusters at the end of the branches, and are composed of oval concave petals of a fine blue colour. 2. The sanctum, with many pairs of obtuse lobes, hath many small lobes placed along the mid-rib by pairs of a darker green colour than those of the foregoing sort. The flowers are produced in loose bunches towards the end of the branches, and are of a fine blue colour, with petals fringed on the edges. This species is also a native of the West India islands, where it is called *bastard lignum vitæ*. 3. The *Alpum* with many blunt-pointed leaves, is a native of the Cape of Good Hope. The plants retain their leaves all the year, but have never yet flowered in this country.

Culture. The first species can only be propagated by seeds, which must be procured from the countries where it naturally grows. They must be sown fresh in pots, and plunged into a good hot-bed, where they will come up in six or eight weeks. While young, they may be kept in a hot-bed of tan-bark under a

frame during the summer; but in autumn, they must be removed into the bark-stove, where they should constantly remain. The second sort may be propagated the same way; but the third is to be propagated by layers, and will live all the winter in a good greenhouse.

Uses. The wood of the first species is of very considerable use both in medicine and in the mechanical arts. Ulric Hutten says this wood was introduced into Europe in 1517; but Braslavous says, not until 1525. It is brought from the West Indies, in large pieces, each weighing from four to five hundred weight: it is hard, compact, and so heavy as to sink in water: the outer part is often of a pale yellowish colour; but the heart is blacker, or of a deep brown. Sometimes it is marbled with different colours. It has little or no smell, except when heated, and then a slight aromatic one is perceived. When chewed, it impresses a mild acrimony, biting the palate and fauces. Its pungency resides in its resinous matter, which it gives it out in some degree to water by boiling, but spirit extracts it wholly.

Of the bark of guaiac, there are two kinds, one smooth, the other unequal on the surface; they are both of them weaker than the wood.

The gum, or rather resin, exudes from the tree; and is of a brown colour, partly reddish, and often greenish, brittle, having a glossy surface when broke, of a pungent taste, affecting the tongue and palate in the same manner as is said of the wood. The chief of what is brought to us is in irregular masses, of a dusky green colour. There is a sort in drops, which is the best, but is very rarely met with.

In the choice of the wood, that which is the freshest, most ponderous, and of the darkest colour, is the best; the largest pieces are to be preferred too; and the best method is to rasp them as wanted, for the finer parts are apt to exhale when the raspings or chips are kept a while. In choosing the gum, prefer those pieces which have flaps of the bark adhering to them, and that easily separate therefrom by a quick blow.

Neumann assures us, that a composition of colophony and balsam of sulphur is imposed on the unwary for true gum guaiacum; but the cheat is easily detected by exposing it to a due degree of heat, by which the odour of the false is perceived to be quite different from that of the true.

The guaiac wood was first introduced into Europe as a remedy for the venereal disease. It is a good assistant to mercury, as it warms and stimulates, and so promotes perspiration and urine; it also proves gently purgative in a somewhat increased dose: and these seem to be its primary virtues. When the excretory glands are obstructed, the vessels lax and flaccid, the habit replete with ferous humours, in many cutaneous and catarrhus disorders, some female weaknesses, in gouty complaints, and rheumatic disorders, it produces good effects. The hectic fever which sometimes follows a salivation, gives way to a decoction of the woods.

A long use of this medicine hath been observed to produce a yellowness in the skin. In this emaciated habits and an acrimonious state of the fluids, it often does harm. It is also improper in hot bilious habits, and where the fibres are very tense.

Three ounces of the wood, or four ounces of the bark, may be boiled in 4lb. of water to 2lb. and if a little liquorice is added at the latter end of the boiling, or when the decoction is taken from the fire, it will abate the disagreeable pungency of this medicine, which affects the throat very much in swallowing it. Of this decoction, at least half a pint should be taken in a day. Of the gum, or extract, the dose may be from gr. v. to ℥ i. which last purges pretty much. These should be dissolved by the mediation of egg, or the mucilage of gum arabic; for otherwise they do not easily mix the juices in the stomach.

A pound of guaiacum wood, distilled over an open fire, gave 3 iiii of acid, which is called spirit, and 3 iis. of empyreumatic oil.—An hard extract of guaiacum is accounted an excellent erubine.

The wood of this tree is so hard, that it breaks the tools which are employed in felling it; and is therefore seldom used as firewood, but is of great use to the sugar-planters for making wheels and cogs to the sugar-mill. It is also frequently wrought into bowls, mortars, and other utensils.

GALEOR, a large town of Indostan in Asia, and capital of a province of the same name, with a strong fort. E. Long. 69. 5. N. Lat. 25. 45.

GUAM, the largest of the Ladrones islands in the South Sea, being about 100 miles in circumference. The inhabitants are almost all natives, but the Spaniards have a garrison which keeps them in awe. The island abounds with excellent fruits, and the air is wholesome; notwithstanding which, the people are subject to the leprosy. E. Long. 139. 25. N. Lat. 13. 25.

GUAMANGA, a considerable town of South America, and capital of a province of the same name in Peru, and in the audience of Lima, with a bishop's see. It is remarkable for its sweetmeats, manufactures, and mines of gold, silver, leadstone, and quicksilver. W. Long. 7. 50. S. Lat. 13. 0.

GUANUCO, a rich and handsome town of S. America, and capital of a district of the same name in the audience of Lima. W. Long. 72. 55. S. Lat. 9. 55.

GUANZAVELCA, a town of South America, in Peru, and in the audience of Lima. It abounds in mines of quicksilver. W. Lon. 71. 59. S. Lat. 12. 40.

GUARANTY, in matters of polity, the engagement of mediatorial or neutral states, whereby they plight their faith that certain treaties shall be inviolably observed, or that they will make war against the aggressor.

GUARD, in a general sense, signifies the defence or preservation of any thing; the act of observing what passes, in order to prevent surprize; or, the care, precaution, and attention, we make use of to prevent any thing from happening contrary to our intention or inclinations.

GUARD, in the military art, is a duty performed by a body of men, to secure an army or place from being surprized by an enemy. In garrison the guards are relieved every day; hence it comes that every soldier mounts guard once every three or four days in time of peace, and much oftener in time of war. See

Honours.

Advanced GUARD, is a party of either horse or foot, that marches before a more considerable body, to give notice of any approaching danger. These guards are either made stronger or weaker, according to situation, the danger to be apprehended from the enemy, or the nature of the country.

Van GUARD. See *Advanced GUARD*.

Artillery GUARD, is a detachment from the army to secure the artillery when in the field. Their *corps de garde* is in the front of the artillery park, and their centres dispersed round the same. This is generally a 48-hours guard; and upon a march, this guard marches in the front and rear of the artillery, and must be sure to leave nothing behind; if a gun or or wagon breaks down, the officer that commands the guard is to leave a sufficient number of men to assist the gunners and matrosses in getting it up again.

Artillery Quarter-GUARD, is frequently a non-commissioned officer's guard from the royal regiment of artillery, whose *corps de garde* is always in the front of their incampment.

Artillery Rear-GUARD, consists in a corporal and six men, posted in the rear of the park.

Corps de GARDE, are soldiers entrusted with the guard of a post, under the command of one or more officers. This word also signifies the place where the guard mounts.

Grand GUARD; three or four squadrons of horse, commanded by a field-officer, posted at about a mile or a mile and a half from the camp, on the right and left wings, towards the enemy, for the better security of the camp.

Forage GUARD, a detachment sent out to secure the foragers, and who are posted at all places, where either the enemy's party may come to disturb the foragers, or where they may be spread too near the enemy, so as to be in danger of being taken. This guard consists both of horse and foot, and must remain on their posts till the foragers are all come off the ground.

Main GUARD, is that from which all other guards are detached. Those who are for mounting guard assemble at their respective captain's quarters, and march from thence to the parade in good order; where, after the whole guard is drawn up, the small guards are detached to their respective posts: then the subalterns throw lots for their guards, who are all under the command of the captain of the main guard. This guard mounts in garrison at different hours, according as the governor pleases.

Piquet GUARD, a good number of horse and foot, always in readiness in case of an alarm: the horses are generally saddled all the time, and the riders booted.

The foot draw up at the head of the battalion, frequently at the beating of the tat-too; but afterwards return to their tents, where they hold themselves in readiness to march upon any sudden alarm. This guard is to make resistance in case of an attack, until the army can get ready.

Baggage GUARD, is always an officer's guard, who has the care of the baggage on a march. The waggoners should be numbered by companies, and follow

Guard.

Guard.

one another regularly: vigilance and attention in the passage of hollow ways, woods, and thickets, must be strictly observed by this guard.

Quarter GUARD, is a small guard commanded by a subaltern officer, posted in the front of each battalion, at 222 feet before the front of the regiment.

Rear GUARD, that part of the army which brings up the rear on a march, generally composed of all the old grand guards of the camp. The rear-guard of a party is frequently eight or ten horse, about 500 paces behind the party. Hence the advance-guard going out upon a party, form the rear-guard in their retreat.

Rear GUARD, is also a corporal's guard placed in the rear of a regiment, to keep good order in that part of the camp.

Standard GUARD, a small guard under a corporal, out of each regiment of horse, who mount on foot in the front of each regiment, at the distance of 20 feet from the freets, opposite the main street.

Trench GUARD, only mounts in the time of a siege, and sometimes consists of three, four, or six battalions, according to the importance of the siege. This guard must oppose the besieged when they fall out, protect the workmen, &c.

Provost GUARD, is always an officer's guard that attends the provost in his rounds, either to prevent desertion, marauding, rioting, &c. See PROVOST.

GUARD, in fencing, implies a posture proper to defend the body from the sword of the antagonist.

Ordinary GUARDS, such as are fixed during the campaign, and relieved daily.

Extraordinary GUARDS, or detachments, which are only commanded on particular occasions; either for the further security of the camp, to cover the foragers, or for convoys, escorts, or expeditions.

GUARDS, also imply the troops kept to guard the king's person, and consist both of horse and foot.

Horse GUARDS, in England, are gentlemen chosen for their bravery, to be entrusted with the guard of the king's person; and are divided into four troops, called the *1st*, *2d*, *3d*, and *4th troop of horse-guards*. The first troop was raised in the year 1660, and the command given to lord Gerard; the second in 1659, and the command given to Sir Philip Howard; the third in 1665, and the command given to earl Feverham; the fourth in 1660, and the command given to earl Newburgh. Each troop has one colonel, two lieutenant-colonels, one cornet and major, one guidon and major, four exempts and captains, four brigadiers and lieutenants, one adjutant, four sub-brigadiers and cornets, and 60 private men.

Horse-Grenadier GUARDS, are divided into two troops, called the *1st* and *2d troops of horse-grenadier guards*. The first troop was raised in 1693, and the command given to lieutenant-general Cholmondeley; the second in 1702, and the command given to lord Forbes. Each troop has one colonel, lieutenant-colonel, one guidon or major, three exempts and captains, three lieutenants, one adjutant, three cornets, and 60 private men.

Women of the GUARD, first raised by Henry VII. in the year 1485. They are a kind of pompous foot-guards to the king's person; and are generally called by a nickname, the *bee-eaters*. They were anciently

250 men of the first rank under gentry; and of larger stature than ordinary, each being required to be six feet high. At present there are but 100 in constant duty, and 70 more not on duty; and when any one of the 100 dies, his place is supplied out of the 70. They go dressed after the manner of king Henry VIII's time. Their first commander or captain was the earl of Oxford, and their pay is 2s. 6d. per day.

Foot-GUARDS, are regiments of foot appointed for the guard of his majesty, and his palace. There are three regiments of them, called the *1st*, *2d*, and *3d regiments of foot-guards*. They were raised in the year 1660; and the command of the first given to colonel Ruffel, that of the second to general Monk, and the third to the earl of Linlithgow. The first regiment is at present commanded by one colonel, one lieutenant-colonel, three majors, 23 captains, one captain-lieutenant, 31 lieutenants, and 24 ensigns; and contains three battalions. The second regiment has one colonel, one lieutenant-colonel, two majors, 14 captains, one captain-lieutenant, 18 lieutenants, 16 ensigns; and contains only two battalions. The third regiment is the same as the second.

The *French GUARDS* are divided into those within, and those without, the palace.—The first are the *gardes du corps*, or body-guards; which consist of four companies, the first of which companies was anciently Scots. See *SCOTS GUARDS*, *infra*.

The guards without are the *Gens d'Armes*, light horse, musqueteers, and two other regiments, the one of which is French, and the other Swiss.

SCOTS GUARDS; a celebrated band, which formed the first company of the ancient *gardes du corps* of France.

It happened from the ancient intercourse between France and Scotland, that the natives of the latter kingdom had often distinguished themselves in the service of the former. On this foundation the company of *Scots guards*, and the company of *Scots gendarmes*, were instituted.—Both of them owed their institution to Charles VII. of France, by whom the first standing army in Europe was formed, anno 1454; and their fates cannot but be interesting to Scotsmen. See *GENDARMES*.

Valour, honour, and fidelity, must have been very conspicuous features of the national character of the Scots, when so great and civilized a people as the French could be induced to choose a body of them, foreigners as they were, for guarding the persons of their sovereigns.—Of the particular occasion and reasons of this predilection, we have a recital by Lewis XII. a succeeding monarch. After setting forth the services which the Scots had performed for Charles VII. in expelling the English out of France, and reducing the kingdom to his obedience, he adds—"Since which reduction, and for the service of the Scots upon that occasion, and for the great loyalty and virtue which he found in them, he selected 200 of them for the guard of his person, of whom he made an hundred men at arms, and an hundred life-guards: And hundred men at arms are the hundred lances of our the ancient ordinances; and the life-guard men are those of our guard, who still are near and about our person."—As to their fidelity in this honourable station; the historian, speaking of Scotland, says, "The French have for ancient a friendship

History of Lewis XII. by Claud Seyll, master of request to that prince, and

Guard. and alliance with the Scots, that of 400 men appointed for the king's life-guard, there are an hundred of the said nation who are the nearest to his person, and in the night keep the keys of the apartment where he sleeps. There are, moreover, an hundred complete lances and two hundred yeomen of the said nation, besides several that are dispersed through the companies: And for so long a time as they have served in France, never hath there been one of them found, that hath committed or done any fault against the kings or their state; and they make use of them as of their own subjects."

The ancient rights and privileges of the Scottish life-guards were very honourable; especially of the twenty-four first. The author of the *Ancient Alliance* says, "On high holidays, at the ceremony of the *royal touch*, the erection of knights of the king's order, the reception of extraordinary ambassadors, and the public entries of cities, there must be six of their number next to the king's person, three on each side; and the body of the king must be carried by these only, wheresoever ceremony requires. They have the keeping of the keys of the king's lodging at night, the keeping of the choir of the chapel, the keeping the boats where the king passes the rivers; and they have the honour of bearing the *white silk fringe* in their arms, which in France is the *coron colour*. The keys of all the cities where the king makes his entry are given to their captain in waiting or out of waiting. He has the privilege, in waiting or out of waiting, at ceremonies, such as coronations, marriages, and funerals of the kings, and at the baptism and marriage of their children, to take duty upon him. The coronation-robe belongs to him: and this company, by the death or change of a captain, never changes its rank, as do the three others."

This company's first commander, who is recorded as a person of great valour and military accomplishments, was Robert Patillock, a native of Dundee; and the band, ever ardent to distinguish itself, continued in great reputation till the year 1578. From that period, the Scots guards were less attended to, and their privileges came to be invaded. In the year 1612, they remonstrated to Lewis XIII. on the subject of the injustice they had suffered, and set before him the services they had rendered to the crown of France. Attempts were made to re-establish them on their ancient foundation; but no negotiation for this purpose was effectual. The troops of France grew jealous of the honours paid them: the death of Francis II. and the return of Mary to Scotland, at a time when they had much to hope, were unfortunate circumstances to them: the change of religion in Scotland, was an additional blow: and the accession of James VI. to the throne of England, disunited altogether the interests of France and Scotland. The Scots guards of France have now, therefore, no connection with Scotland but the name.

GUARD-BOAT, a boat appointed to row the rounds amongst the ships of war which are laid up in any harbour, &c. to observe that their officers keep a good look-out, calling to the guard-boat as she passes, and not suffering her crew to come on board, without having previously communicated the watch-word of the night.

GUARD-SHIP, a vessel of war appointed to superintend the marine affairs in a harbour or river, and to see that the ships which are not commissioned have their proper watchword kept duly, by sending her guard-boats around them every night. She is also to receive seamen who are imprisoned in the time of war.

GUARDIAN, in law, a person who has the charge of any thing; but more commonly it signifies one who has the custody and education of such persons as have not sufficient discretion to take care of themselves and their own affairs, as children and idiots.

Their business is to take the profits of the minor's lands to his use, and to account for the same: they ought to sell all moveables within a reasonable time, and to convert them into land or money, except the minor is near of age, and may want such things himself; and they are to pay interest for the money in their hands, that might have been so placed out; in which case it will be presumed that the guardians made use of it themselves. They are to sustain the lands of the heir, without making destruction of any thing thereon, and to keep it safely for him: if they commit waste on the lands, it is a forfeiture of the guardianship, 3 Edw. I. And where persons, as guardians, hold over any land, without the consent of the person who is next intitled, they shall be adjudged trespassers, and shall be accountable; 6 Ann. cap. xviii.

GUARDIAN, or Warden, of the Cinque-ports, is an officer who has the jurisdiction of the Cinque-ports, with all the power which the admiral of England has in other places.

GUARDIAN of the Spiritualities, the person to whom the spiritual jurisdiction of any diocese is committed, during the time the see is vacant. A guardian of the spiritualities may likewise be either such in law, as the archbishop is of any diocese within his province; or by delegation, as he whom the archbishop or vicar-general for the time appoints. Any such guardian has power to hold courts, grant licences, dispensations, probates of wills, &c.

GUARINI (Battista), a celebrated Italian poet, born at Ferrara, in 1538. He was great-grandson to Guarino of Verona and was secretary to Alphonso; Duke of Ferrara, who entrusted him with several important commissions. After the death of that prince, he was successively secretary to Vincenzo de Gonzaga, to Ferdinand de Medicis grand duke of Tuscany, and to Francis Maria de Feltri duke of Urbino. But the only advantages he reaped under these various masters, were great encomiums on his wit and compositions. He was well acquainted with polite literature; and acquired immortal reputation by his Italian poems, especially by his *Pastor Fido*, the most known and admired of all his works, and of which there have been innumerable editions and translations. He died in 1612.

GUARDIA, or GUARDA, a town of Portugal, in the province of Beira, with a bishop's see. It contains about 2300 inhabitants, is fortified both by art and nature, and has a stately cathedral. W. Lon. 5. 17. N. Lat. 40. 20.

GUARDIA-Alferaz, a town of Italy, in the kingdom of Naples, and in the Contado-di-Molise, with a bishop's see. E. Lon. 15. 53. N. Lat. 51. 50.

GUARGALA, or GUERGUELA, a town of Africa,

Gustalla
||
Guber.

rica, and capital of a small kingdom of the same name, in Biedlergerid, to the S. of Mount Atlas. E. Lon. 9. 55. N. Lat. 28. 0.

GUASTALLA, a strong town of Italy, in the duchy of Mantua, with the title of a duchy, remarkable for a battle between the French and Imperialists in 1734. It was ceded to the duke of Parma in 1748, by the treaty of Aix-la-Chapelle. It is seated near the river Po, in E. Lon. 10. 33. N. Lat. 44. 55.

GUATIMALA, the Audience of, in North America, and in New Spain, is above 750 miles in length, and 450 in breadth. It abounds in chocolate, which they make use of instead of money. It has 12 provinces under it: and the native Americans, under the dominions of Spain, profess Christianity; but it is mixed with great many of their own superstitions. There is a great chain of high mountains, which run across it from E. to W. and it is subject to earthquakes and storms. It is however very fertile; and produces, besides chocolate, great quantities of cochineal and cotton.

GUATIMALA, a province of North America, in New Spain, and in the Audience of the same name; bounded on the W. by Soconusco, on the N. by Verapaz and Honduras, on the E. by Nicaragua, and on the S. by the fourth sea. St. Jago de Guatemala is the capital of the whole audience.

GUATIMALA, a large and rich town of North America, in New Spain; and capital of a government of the same name, with a bishop's see, and an university. It carries on a great trade, especially in chocolate. W. Lon. 91. 30. N. Lat. 14. 0.

GUATIMALA (the Volcano of), is a mountain, which throws out fire and smoke. St. Jago de Guatemala was almost ruined by it in 1541. It was afterwards rebuilt at a good distance from this dreadful mountain. A few years ago, however, it was again destroyed, with circumstances more terrible perhaps than any mentioned in history.

GUAXACA, a province of North America, in New Spain, which is very fertile in wheat, Indian corn, cochineal, and cassia. It is bounded by the gulph of Mexico on the N. and by the fourth sea on S. It contains mines of gold, silver, and crystal. Guaxaca is the capital town.

GUAXACA, a town of North America, in the Audience of Mexico, and capital of a province of the same name, with a bishop's see. It is without walls, and does not contain above 2000 inhabitants; but it is rich, and they make very fine sweet-meats and chocolate. It has several rich convents, both for men and women. W. Lon. 100. 0. N. Lat. 17. 45.

GUAYRA, a district of the province of La Plata, in South America, having Brasil on the E. and Paraguay on the W.

GUBEN, a handsome town of Germany, in Lower Lusatia, seated on the river Niesse, and belonging to the house of Sax-Merfenburg. E. 14. 59. N. Lat. 51. 55.

GUBER, a kingdom of Africa, in Negroland. It is surrounded with high mountains; and the villages, which are many, are inhabited by people who are employed in taking care of their cattle sheep. There are also abundance of artificers, and linen-weavers, who send their commodities to Tombuto. The whole country is overflowed every year by the inundations of

the Niger, and at that time the inhabitants sow their rice. There is one town, which contains almost 6000 families, among whom are many merchants.

GUBIO, a town of Italy, in the territory of the church, and in the duchy of Urbino, with a bishop's see. E. Lon. 12. 41. N. Lat. 43. 18.

GUDGEON, in ichthyology; a species of cyprinus. See CYPRINUS.

This fish, though small, is of so pleasant a taste, that it is very little inferior to smelt. They spawn twice in the summer-season; and their feeding is much like the barbel in streams and on gravel, dighting all manner of flies: but they are easily taken with a small red worm, fishing near the ground; and being a leather-mouthed fish, will not easily get off the hook when struck.—The gudgeon may be fished for with float, the hook being on the ground; or by hand, with a running line on the ground, without cork or float. But although the small red worm above-mentioned is the best bait for this fish, yet wasps, gentles, and cad-baits will do very well. You may also fish for gudgeons with two or three hooks at once, and find very pleasant sport, where they rise any thing large. When you angle for them, stir up the sand or gravel with a long pole; this will make them gather to that place, bite faster, and with more eagerness.

Sea-GUDGEON, Rock-fish, or Black Goby. See GOBIUS.

GUELPHS, or GUELFs, a celebrated faction in Italy, antagonists of the GIBELINS. See GIBELIN.

The Guelphs and Gibelins filled Italy with blood and carnage for many years. The Guelphs stood for the Pope, against the emperor. Their rise is referred by some to the time of Conrad III. in the twelfth century; by others, to that of Frederic I.; and by others, to that of his successor Frederic II. in the thirteenth century.

The name of Guefs is commonly said to have been formed from *Welfs*, or *Welfs*, on the following occasion: the emperor Conrad III. having taken the duchy of Bavaria from Welfe VI. brother of Henry duke of Bavaria, Welfe, assisted by the forces of Roger king of Sicily, made war on Conrad, and thus gave birth to the faction of the Guefs.

Others derive the name *Guefs* from the German *Wolfs*, on account of the grievous evils committed by that cruel faction: others deduce the denomination from that of a German called *Guefs*, who lived at Pi-sfoye; adding, that his brother, named *Gibel*, gave his name to the Gibelins. See (History of) ITALY.

GUELDERLAND, one of the united provinces, bounded on the W. by Utrecht and Holland, on the E. by the bishoprick of Munster and the duchy of Cleves, on the N. by the Zuyder sea and Overysse, and on the S. it is separated from Brabant by the Maas. Its greatest extent from N. to S. is about 47 miles, and from W. to E. near as much; but its figure is very irregular. The air here is much healthier and clearer than in the maritime provinces, the land lying higher. Excepting some part of what is called the *Veluwe*, the soil is fruitful. It is watered by the Rhine, and its three branches, the Wahal, the Yssel, and the Leck, besides lesser streams. In 1079, it was raised to a county by the emperor Henry IV. and in 1339 to a duchy by the emperor Lewis of Bavaria. It had dukes of its own till 1528, when it was yielded up to the

Gubio
||
Guelder-
land.

Guel-
dres
||
Guernsey.

the emperor Charles V. In 1579, it acceded to the union of Utrecht. It is divided into three districts, each of which has its states and diets. Those for the whole province are held twice a-year at the capital towns. The province sends 19 deputies to the states-general. Here are computed 285 Calvinist ministers, 14 Roman-Catholic congregations, 4 of the Lutheran persuasion, besides 3 others of Remonstrants and Anabaptists. The places of most note are Nimeguen, Zutphen, Arnheim, Harderwyk, Loo, &c.

GUELDRES, a strong town of the Netherlands, in the duchy of the same name. It was ceded to the king of Prussia by the peace of Utrecht, and is seated among marshes. E. Lon. 6. 21. N. Lat. 51. 30.

GUERICKE, or GUERICHE, (Otho), the most celebrated mathematician of his time, was born in 1602. He was the inventor of the air-pump; and author of several works in natural philosophy, the chief of which is *Experimenta Magdeburgica*. He died in 1686.

GUERNSEY, an island in the English channel, on the coast of Normandy, subject to Britain; but, (as well as the adjacent islands,) governed by its own laws. See JERSEY.—Of this island, Dr Campbell gives the following account. "It lies 20 leagues south-west from Weymouth in Dorsetshire, between eight and nine leagues west from the coast of Normandy, 13 south of Bretagne, seven north-west from Jersey, five south-west from Alderney, and two west from Sark. In length from north-east to south-west, about twelve miles; in breadth, from south to north, about nine; in circumference, upwards of 30; containing 50 square miles, or 32,000 acres. The climate is mild and temperate; not subject to excessive heats, much less to severe cold; somewhat windy; but, taking all things together, equally healthy and pleasant. The soil is, generally speaking, rich and fertile; the country, though sufficiently inclosed with stone fences, yet more open than in Jersey, and as capable of cultivation of every kind. On the north side, the coast is commonly low and flat, rising gradually, so that on the south side the cliffs are of a prodigious height. The face of the country is variegated with hills and little eminences, and tolerably well watered with springs and sharp gravelly streams. There was formerly a fine lake, about half a league in extent, now filled up, and turned into a meadow; but many gentlemen have still very beautiful and convenient fish-ponds.

"There are very few countries in the world more capable of improvement. Most of the rising grounds afford a short thick grass, equally beautiful to the eye, and succulent as pasture. Roots and herbs it produces of all kinds, esculent, medicinal, and aromatic; with a profusion of flowers that grow wild, and are exquisitely fragrant. All sorts of shrubs and fruit-trees flourish here: and there is some, though but little timber; not through any defect of soil or climate, but because they cannot conveniently afford it room. Grain they have of every species we cultivate in Britain, but more especially wheat; and though they have not either lime, chalk, or marl, yet the sea-wreck answers all the intention of manure, so well as to keep their ground in constant heart. They have large quantities of sheep, but small in size; and had formerly a very singular breed, of which the ewes had

four horns, and the rams six; but these are now become very scarce. Their black cattle are in such abundance, as not only to support their own uses, but to furnish also a considerable exportation; and their horses, though but little, are equally strong and hardy. The sea also furnishes a prodigious variety as well as plenty of fish, more especially red and grey mullet, excellent mackerel, and, above all, conger-eels. To these advantages we may add, the singular privilege of being free from all venomous creatures.

"There are in this island ten parishes, each of which is divided into several vintons, for the more easy management of affairs, civil, ecclesiastical, and military, and the choice of their respective officers and magistrates. Though the country is very fully peopled, yet the houses are scattered up and down, according to the humour or the convenience of the inhabitants: so that there is, properly speaking, but one town in the island, which is likewise the only haven of any resort; though there are some creeks on the north and west sides of the island, such as Bazon, L'Aucresse, Ferminer, St Sampson, and the West Passage. All these ports are in a state of nature; but might be certainly improved and fortified, which would be productive of many advantages to the island; as was long ago observed and proposed to government by captain Yarranton. In the reign of king Charles II. when the French formed an insidious design of making themselves masters of this isle by treachery, it left such an impression on his majesty's mind, that some years after he sent over the lord Dartmouth, accompanied by certain engineers, who discovered on the north-west side of the isle, a deep bay, which, by the help of a mole, might cover a numerous squadron, even of ships of the line, under the protection of what was also intended to be built, a strong castle: but his exchequer being exhausted, this necessary work was never carried into execution. As this port would look full into the channel, it deserves consideration, how far it might be useful to us in the time of a French war, and of what infinite detriment it might prove if this island should ever fall into the hands of our enemies.

"The inhabitants are very industrious in their respective employments; naturally sober, frugal in their manner of living, honest in their dealings, sincere in their religion, which is that of the church of England, and loyal to their princes, as well as steady to the British interest. They are, however, reserved to a degree that makes them sometimes thought morose; they are somewhat suspicious; and, which is their greatest error, they are, or at least were, very litigious. They are good husbandmen in their own way, and manage the sea-wreck (which first serves the poor people for fuel, and then its ashes are employed by those in better circumstances for manure) with great skill, and under very prudent regulations. The wreck is cut in summer, and about the vernal equinox, by the proclamation of the magistrates, and when dried, distributed by their order. As for the winter-wreck, which after storms is thrown in large quantities on the coast; this is also equitably divided, and being strewed wet, and so ploughed into the ground, renders it continually fertile. They have a stronger turn, however, to grazing, than to agriculture; and though they bring in annually some corn, yet in the same space they send out a few hundred cattle,

Guernsey.

Guernsey.

cattle. They are still more inclined to orchards, which enables them to make many thousand hogheads of cyder every year; of which, it being the common drink of the people, they export but little. The woollen is their principal manufacture, for the carrying on of which they are allowed to import 2000 tons from England, which they work up chiefly in stockings, waistcoats, and breeches. They might certainly make their fishery turn to profit, more especially as of late years they have set up salt-works; and yet, except lobsters, I never heard that any of their fish went to a foreign market. Our French and Portugal merchants have large flocks of wine here, which they import as they have occasion. As they are enabled, by this method, to keep it to a proper age before they are obliged to pay the duty, it seems to be a benefit to the mother-country, by putting it in their power both to buy and sell cheaper: as on the other hand, from the rent of warehouses, the subsisting factors and their servants, the resort of ships employed in this trade, it must be very advantageous to the inhabitants of this island. It is a point of justice to observe, that this manner of depositing wines, has nothing at all to do with smuggling; a practice equally injurious to the interests of this country and to the people of Guernsey, as it breeds few seamen, is carried on in very small vessels, and upon the whole is not only an infamous, but a very unprofitable kind of traffic. Heretofore, merchants of this isle traded to most parts of Europe, and had several stout ships of their own; and if this vile practice was abolished, as it might easily be, without any violation of the liberties of the people, they would soon find their account in it, by the revival of many lucrative branches of commerce. As they take from England some of the necessaries, and almost all the conveniences, of life, such as corn, malt-liquor, sugars, spices, coals, household-furniture, many species of the iron and leather manufactures, grocery, haberdashery, and hard-ware, the balance is greatly in our favour; and must continually increase, in proportion as they augment in number, and grow easier in circumstances. At present, upon a very moderate computation, there are in Guernsey upwards of 15,000 souls.

"The several islets and vast chains of rocks that surround this country on every side, and cause such a variety of tides and currents, add much to the security of the place, by rendering it equally difficult and dangerous for ships to approach it, unless they have pilots aboard extremely well acquainted with the coast. On the south side, the cliffs are prodigiously high; so that the old writers say, it looks like a park in the sea, impaled with rocks. On the west side lie the Hanoyas, or, as the French write them, *Hanovaux*, which cover that coast so effectually, that a descent there is little to be feared. At the north-west extremity lies a little island called the *Howe*; which would be a very convenient place for a salt-work, glass-house, or manufactory of soap. At the north-east extremity we meet with St Michael in the vale, a peninsula some miles in extent, connected with Guernsey by a very narrow isthmus, with bays that might be rendered useful on both sides. This peninsula is likewise guarded by rocks and islets, the most considerable of which are the Bryants, the Hummet, and the Hays. South-east from the vale, lies the island of Harnet, or Arne, about

a league in compass, formerly desart, but now cultivated. At a league south from thence lies Brichoe, of less extent; and between both, the little island of Gythau, or Jethau, which serves the governor for a kind of park, or rather paddock.

GUIANA, a large country of South America, is bounded on the east and north by the Atlantic ocean, and the river Oroonoko; on the south, by the river of the Amazons; and on the west, by the provinces of Grenada and New-Andalusia, in Terra-Firma, from which it is separated both on the west and north by the river Oroonoko. It extends above 1200 miles from the north-east to the south-west, that is, from the mouth of the river Oroonoko to the mouth of the river of Amazons, and near 600 in the contrary direction.

Most geographers divide it into two parts, calling the country along the coast *Caribbeana Proper*, and the interior country *Guiana Proper*: the last is also styled *El Dorado* by the Spaniards, on account of the immense quantity of gold it is supposed to contain.

The Portuguese, French, and Dutch, have all settlements along the coast. What lies south of Cape North belongs to the first of these nations; the coast between Cape North and Cape Orange is possessed by the natives; French Guiana, Old Cayenne, or Equinoctial France, extends from Cape Orange, about 240 miles along the coast, to the river Marani; where the Dutch territory begins, and extends to the mouth of the Oroonoko.

Along the coast, the land is low, marshy, and subject to inundations in the rainy season, from a multitude of rivers which descend from the inland mountains. Hence it is, that the atmosphere is suffocatingly hot, moist, and unhealthy, especially where the woods have not been cleared away. Indeed, the Europeans are forced to live in the most disagreeable situations, and fix their colonies at the mouths of the rivers, amidst stinking marshes, and the putrid ooze of salt morasses, for the convenience of exportation and importation.

"Dutch Guiana (according to an account lately published by a gentleman who resided several years at Surinam as a physician) was first discovered by Columbus in 1498. It lies between the 7° of north, and the 5° of south latitude, and between the 53° and 60° of longitude west from London. It is bounded on the north and east, by the Atlantic; on the west, by the rivers Oroonoko and Negroe; and on the south, by the river of Amazons.

"It is now divided between the Spaniards, Dutch, French, and Portuguese; but except its sea-coast, and lands adjacent to its rivers, it has hitherto remained unknown to all but its original natives; and even of these, it is only the Dutch territories that foreigners have any knowledge of; for those of the Spaniards, French, and Portuguese, are inaccessible to them.

"This country, on account of the diversity and fertility of its soil, and of its vicinity to the equator, which passes through it, affords almost all the productions of the different American countries between the tropics, besides a variety peculiar to itself.

"Dutch Guiana was formerly the property of the English, who made settlements at Surinam, where a kind

Guiana.

kind of corrupt English is still spoken by the negroes. The Dutch took it in the reign of Charles the Second; and it was ceded to them by a treaty in 1674, in exchange for what they had possessed in the province now called *New York*.

The land for 50 miles up the country from the sea-coast is flat; and, during the rainy seasons, covered two feet high with water. This renders it inconceivably fertile, the earth, for 12 inches deep, being a stratum of perfect manure: an attempt was once made to carry some of it to Barbadoes; but the wood-ants so much injured the vessel, that it was never repeated. The excessive richness of the soil is a disadvantage, for the canes are too luxuriant to make good sugar; and, therefore, during the first and second crop, are converted into rum.

There are some trees on this part; but they are small and low, consisting chiefly of a small species of palm, intermixed with a leaf near 30 feet long and three feet wide, which grows in clusters, called a *Troaslie*; and, at the edges of running-water, with mangroves.

Farther inward the country rises; and the soil, though still fertile, is less durable. It is covered with forests of valuable timber, that are always green; and there are some sandy hills, though no mountains; in the French territories, however, there are mountains, according to the report of the Indians, for they have never been visited by any other people.

In this country the heat is seldom disagreeable: the trade-winds by day, the land breezes in the evening, and the invariable length of the nights, with gentle dews, refresh the air, and render it temperate and salubrious. There are two wet seasons, and two dry, of three months each, in every year; and, during more than a month in each wet season, the rain is incessant. The dry seasons commence six weeks before the equinoxes, and continue six weeks after. The wet seasons are more wholesome than the dry, because the rains keep the waters that cover the low lands, next the sea, fresh and in motion; but during the dry season it stagnates, and, as it wastes, becomes putrid, sending up very unwholesome exhalations. Blossoms, green and ripe fruit, are to be found upon the same tree in every part of the year. There are some fine white and red agates in Guiana, which remain untouched; and mines of gold and silver, which the Dutch will not suffer to be wrought.

The inhabitants of Guiana are either natives, who are of a reddish brown; or negroes and Europeans; or a mixed progeny of these in various combinations. The natives are divided into different tribes, more or less enlightened, and polished, as they are more or less remote from the settlements of the Europeans. They allow polygamy, and have no division of lands. The men go to war, hunt, and fish; and the women look after domestic concerns, spin, weave, in their fashion, and manage the planting of cassava and manive, the only things which in this country are cultivated by the natives. Their arms are bows and arrows; short poisoned arrows, blown through a reed, which they use in hunting; and clubs made of a heavy wood called *iron-wood*. They eat the dead bodies of those that are slain in war, and sell for slaves those they take prisoners; their wars being chiefly undertaken to fur-

VOL. V.

nish the European plantations. All the different tribes go naked. On particular occasions they wear caps of feathers; but, as cold is wholly unknown, they cover no part but that which distinguishes the sex. They are cheerful, humane, and friendly; but timid, except when heated by liquor, and drunkenness is a very common vice among them.

Their houses consist of four stakes set up in a quadrangular form, with crofs poles, bound together by slit nibbees, and covered with the large leaves called *troaslies*. Their life is ambulatory; and their house, which is put up and taken down in a few hours, is all they have to carry with them. When they remove from place to place, which, as they inhabit the banks of rivers, they do by water in small canoes, a few vessels of clay made by the women, a flat stone on which they bake their bread, and a rough stone on which they grate the roots of the cassava, a hammock and a hatchet, are all their furniture and utensils; most of them, however, have a bit of looking-glass framed in paper, and a comb.

Their poisoned arrows are made of splinters of a hard heavy wood, called *cacario*; they are about 12 inches long, and somewhat thicker than a coarse knitting needle: one end is formed into a sharp point; round the other is wound some cotton, to make it fit the bore of the reed through which it is to be blown. They will blow these arrows 40 yards with absolute certainty of hitting the mark, and with force enough to draw blood, which is certain and immediate death. Against this poison no antidote is known. The Indians never use these poisoned arrows in war, but in hunting only, and chiefly against the monkeys; the flesh of an animal thus killed may be safely eaten, and even the poison itself swallowed with impunity.

GUIAQUIL, a town, bay, and harbour of South America, in Peru, and capital of an audience of the same name. W. Long. 76. 55. S. Lat. 2. o.

GUIARA, a sea-port town of South America, and on the Caracca coast. The English attempted to take it in 1749 and 1743; but they were repulsed both times. W. Long. 66. 5. N. Lat. 10. 35.

GUICCIARDINI (Francisco), a celebrated historian, born at Florence in 1482. He professed the civil law with reputation, and was employed in several embassies. Leo X. gave him the government of Modena and Reggio, and Clement VII. that of Romagna and Bologna. Guicciardini was also lieutenant-general of the pope's army, and distinguished himself by his bravery on several occasions; but Paul III. having taken from him the government of Bologna, he retired to Florence, where he was made counsellor of state, and was of great service to the house of Medicis. He at length retired into the country to write his History of Italy, which he composed in Italian, and which comprehends what passed from the year 1494 to 1532. This history is greatly esteemed; and was continued by John Baptist Adriani, his friend. He died in 1540.

GUICCIARDINI (Lewis), his nephew, composed a history of the Low Countries, and memoirs of the affairs of Europe, from 1530 to 1560. He wrote with great spirit, against the persecution of the duke d'Alva, for which he imprisoned him. Died in 1583.

GUIDI (Alexander), an eminent Italian poet,

born at Pavia in 1650. Having a desire to see Rome, he there attracted the notice of queen Christina of Sweden, who retained him at her court; he beside obtained a considerable benefice from pope Innocent XI. and a pension from the duke of Parma. For a good office he did the state of Milan with prince Eugene, he was enrolled among the nobles and decorations of that town; and died in 1712. Nature had been kinder to his intellects than to his exterior form; his body was small and crooked, his head was large, and he was blind of his right eye. A collection of his works was published at Verona in 1726.

GUIDO (Reni), an illustrious Italian painter, born at Bologna in 1575. In his early age he was the disciple of Denis Calvert, a Flemish master of good reputation; but afterwards entered himself in the school of the Caracci. He first imitated Ludovico Caracci; but fixed at last in a peculiar style of his own, that secured him the applause of his own time and the admiration of posterity. He was much honoured, and lived in splendor; but an unhappy attachment to gaming ruined his circumstances; the reflection on which brought on a languishing disorder, that put an end to his life in 1642. There are several designs of this great master in print, etched by himself.

GUIENNE, the largest province of France, bounded on the north by Saintonge, Angoumois, and Limousin; on the east by Limousin, Auvergne, and Languedoc; on the south by the Pyrenees, Lower Navarre, and Bearn; and on the west by the ocean. It is about 225 miles in length, and 200 in breadth. It is divided into the Upper and Lower. The Upper comprehends Querci, Rouergue, Armagnac, the territory of Comminges, and the county of Bigorre. The Lower contains Bourdelois, Perigord, Agenois, Condomois, Bazadois, the Lander, Proper Gascony, and the district of Labour. The principal rivers are the Garonne, the Adour, the Tarn, the Aveyron, and the Lot. Bourdeaux is the capital town.

GUILLANDINA, the NICKAR TREE; a genus of the monogynia order, belonging to the decandria class of plants.

Species. 1. The bonduc, or yellow nickar. 2. The bonducella, or gray nickar. These are climbing plants, natives of the West Indies, where they rise to the height of twelve or fourteen feet: the flowers come out at the wings of the stalks; and are composed of five concave yellow petals. They are succeeded by pods about three inches long and two broad, closely armed with slender spines, opening with two valves, each inclosing two hard seeds about the size of children's marbles, of a yellowish colour. 3. The moringa, or morunga nickar, is a native of the island of Ceylon, and some places on the Malabar coast. It rises to the height of 25 or 30 feet, having flowers produced in loose bunches from the side of the branches, and composed of an unequal number of petals.

Culture and Uses. These plants being natives of warm climates, require to be kept through the winter in a stove in this country. They are propagated by seeds; but those of the first sort are so hard, that unless they are soaked two or three days in water before they are put into the ground, or placed under the pots in the tan-bed to soften their covers, they

will remain for years without vegetating.—The roots of the third sort are scraped when young, and used by the inhabitants of Ceylon and Malabar as those of horle-radish are in Europe. The wood dyes a beautiful blue colour.

GUILD, (from the Saxon *gildan*, to "pay"), signifies a fraternity or company, because every one was *gildare*, i. e. to pay something towards the charge and support of the company. As to the original of these guilds or companies, it was a law among the Saxons, that every freeman of fourteen years of age should find sureties to keep the peace, or be committed; upon which the neighbours entered into an association, and became bound for each other, either to produce him who committed any offence, or to make satisfaction to the injured party: in order to this, they raised a sum among themselves, which they put into a common stock; out of which they, upon occasion, made a pecuniary compensation according to the quality of the offence committed. These guilds are now companies joined together, with laws and orders made by themselves, by the licence of the prince.

GUILD, in the royal boroughs of Scotland, is still used for a company of merchants, who are freemen of the borough. See *Borough*.

Every royal borough has a dean of *guild*, who is the next magistrate below the bailiff. He judges of controversies among men concerning trade; disputes between inhabitants touching buildings, lights, water-courses, and other nuisances; calls courts, at which his brethren of the *guild* are bound to attend; manages the common stock of the *guild*; and amerces and collects fines.

GUILD, *Gild*, or *Geld*, is also used among our ancient writers, for a compensation, or mulct, for a fault committed.

GUILD-HALL, the chief hall of the city of London, for holding of courts, and for the meeting of the lord-mayor and commonalty, in order to make laws and ordinances for the welfare and regulation of the city.

Dean of *Guild*, in Scots law, a magistrate of a royal borough, who is head of the merchant-company. See *Law*, N^o clviii. 11.

GULDFORD, or GULDEFORD, a borough-town of Surrey, situated on the river Wye, thirty-miles south-west of London. It sends two members to parliament. Long. 0. 40. N. Lat. 51. 16.

GUILLEMOT, in ornithology. See *Colymbus*.

GUILLIM, (John), of Welsh extraction, was born in Herefordshire, about the year 1565. Having completed his education at Brazen-nose college, Oxford, he became a member of the college of arms in London; and was made *rouge croix* purfuitant, in which post he died in 1621. He published, in 1610, a celebrated work, intitled *the Display of Heraldry*, folio, which has gone through many editions. To the fifth, which came out in 1679, was added *A treatise of honour civil and military*, by captain John Loggan.

GUINEA, a large tract of country lying along the west side of the continent of Africa. It is divided into the upper and lower, the latter of which is also called *Congo*. See *Congo*.—These two together, reckoning from Cape Tigrin, near the mouth of the river Sierra Leoni in N. Lat. 9° 18', to Cape Negro

Guinea.

Guinea.

gro in S. Lat. 16° 45', extend about 2500 miles along the sea-coast, and many more, if we reckon all the turnings, windings, and bays. As for its inland extent, it is not easy to ascertain it.

As all this country lies between the tropics, the air is excessively hot, especially from the beginning of September to the end of March, which, with the coolness of the nights, the frequent thick, stinking, sulphureous mists, and the periodical rains, when the flat country is overflowed, makes it very unhealthy, especially to Europeans, to whom it is generally fatal. The winds on the coast of Guinea Proper set from west to east, directly contrary to the trade-winds, except in the rainy season, between the vernal and autumnal equinox, when they have violent storms of wind, with terrible thunder and lightning: and these winds blowing from the south, the shipping on the coast at this time are in great danger of being wrecked; and, even in the calmest weather, there is always such a surf beating upon the shore, that it is very difficult and dangerous landing. As to the face of the country, a variety of hills, valleys, woods, and plains, are seen all along the coast, intermixed with bogs and morasses.

The animals of Guinea are the same as those of Caffraria; but their grain is different. Here is no wheat; but plenty of Guinea grain, rice, maize, or Indian corn. There are no grapes here; but the palm-tree affords them wine, and their cocoa-nuts a pleasant drink. Here are also oranges and lemons, plantains, pomegranates, tamarinds, pine-apples, and other tropical fruits.

Of forest-trees they have a great variety, which grow to a prodigious height and bulk; some of them being excellent timber, and having a very beautiful grain.

Their metals are gold, copper, and iron. The gold is found by the natives in the sands of their rivulets in dust; sometimes they meet with large pieces, but there are no gold mines open, and possibly there may be no mines of that metal. As it is found washed down into the brooks and rivulets in every place our people bring it from, it seems probable that it lies pretty near the surface. There is plenty of salt on the Guinea coast; which they make by letting the salt-water into shallow pans in the dry seasons, and the sun exhaling the water, the salt is left at bottom.

Besides gold, ivory, and slaves, this country affords indigo, wax, gum-fenega, gum-tragacanth, and a variety of other gums and drugs. These articles may be had in most parts of this extensive coast, but chiefly in Proper Guinea.

Of mountains in Guinea, the most remarkable are those of Sierra Leoni. The principal capes are those of Cape Blanco, Cape Verd, Cape Leon, Cape St. Ann's, Cape Palmas, and Cape Three-Points, Cape Formosa, Cape Monte, Cape St. John, Cape Lopes, Cape Ledé, and Cape Negro. The chief bays are the Cyprian or Cintra Bay, and the Bite of Guinea. Of the rivers, the most considerable are those of Coanzo and Ambrisi, the Zaara, the Lunde, the Cameron, the Formosa, the Volta, the Sierra Leon, and the Sherbro. All these run from east to west, (except the Volta, which runs from north to south),

and fall into the Atlantic.

The natives of Guinea, descended from the original inhabitants, are all negroes, well known by their flat noses, thick lips, and short woolly hair; though there are among them many camps or villages of Arabs, who are of a tawny complexion; and there is a mixed breed of Mulattoes, proceeding from the commerce of the Portuguese and natives, who are almost as dark as the negroes.

As to their habits, the common people have generally only a cloth about their middle; but people of condition have another over their shoulders, and are adorned with abundance of rings, and bracelets of gold, ivory, or copper: the arms, legs, and a great part of the bodies of the men are naked; but the women are veiled, when they go abroad.

The Europeans tell us, that the natives have generally more wit than honesty, frequently mixing their gold with base metal: but there is reason to suspect, that the little tricks and cheats they use in trade have been taught them by the Christians with whom they traffic; and if the women are lewd, they are not worse than those that accuse them, who first tempt them to incontinence, and then reproach them for it.

Every family almost in Guinea make their own tools and utensils: they are all smiths, carpenters, and masons; building their own houses or huts, which are, indeed, of very slight materials; and, till the Europeans brought them hammers, &c. one stone served them for an anvil, and another for a hammer. The women manage all the husbandry, as well as their domestic affairs: they dig, sow, plant, and bring in the harvest, while the husband looks on: so that the more wives a man has, the richer he is said to be in this country; and some negroes on the coast make money by letting out their wives; and, indeed, they make little difference between their wives and their slaves.

The small-pox is as fatal to the negroes as the plague, and worms are an epidemical distemper; not those in the stomach and bowels; but a species that are found between the skin and the flesh, and give the patient extreme pain, till they are drawn out: which is an operation that sometimes takes a month to perform; for, if they attempt to draw it out too hastily, the worm breaks, and rots in the flesh, or breaks out in another place. Some negroes have nine or ten of these worms in their skin at once, and the Europeans are not entirely free from them. A greedy ravenous appetite is also reckoned among the diseases of the Guinea negroes; and the venereal disease is often fatal to them, having no effectual methods of cure of their own: nor are the wounds they receive in the field of Mars less dangerous than the other, especially if the bones are shattered; for they can cure only ordinary flesh-wounds, which they do by applying poultices of herbs. The negroes are seldom long-lived, though they are generally healthful while they live.

The distempers the Europeans are subject to on this coast are fevers, fluxes, and colics, which are occasioned by indifferent water and bad air; their settlements lying near the coast, where the fogs and streams arising from the ooze and salt-marshes, and

Guinea.

the stinking fish the natives dry on the beach, corrupt the air, and render it fatal to the foreigners. The most temperate men find it difficult to preserve their health; but a great many hasten their death by their intemperance, or negligence, exposing themselves to the cold air in the evening, after a very hot day. This sudden change, from one extreme to the other, has often very bad effects in hot climates.

As to religion, the natives generally acknowledge one Supreme Being, that created the universe; and yet pay him no manner of worship or adoration, never praying to him, or giving him thanks for any thing they enjoy. They believe he is too far exalted above poor mortals to take notice of them; and therefore pray to a multitude of inferior deities, of which there are some common to whole nations, and yet every man has a god of his own choosing besides.

In Guinea there are some sovereign princes, whose dominions are very extensive, rich, powerful, and themselves arbitrary, limited by no laws, or any other restraint; and there are many others, to whom the Dutch and other Europeans have given the name of kings, whose dominions do not exceed the bounds of an ordinary parish, and whose power and revenues are proportionably mean.

The country of Guinea-*Proper* extends from Cape Palmas to the river Volta, about an hundred and fifty leagues along the sea-coast, which bounds it to the south. The Europeans divide it into two parts, the Tooth and the Gold Coast; the former extending from Cape Palmas to the river Sucria da Costa, 18 miles west of the river Mancha, by some called *Rio Cobre*, and Aukeber; and the latter from thence to the river Volta.

The Tooth, Ivory, or Quaqua Coast, is so called from the great plenty of elephants teeth found there. According to Dapper, the inhabitants of this coast, though they seem the most barbarous and savage people of all Guinea, are really the most civilized and the most reasonable, and pass for such among their neighbours. When they come to trade with any ship, they take some water into their hands, and let a few drops of it fall into their eyes; which is a kind of oath, by which they intimate, that they would rather lose their eye-sight than cheat those they trade with. They are no less averse to drunkenness than to fraud; and though their country produces numbers of palm-trees, yet they drink no palm-wine, but only a certain liquor, called *bordon*, or *tombo-wine*, which they mix with water. Their chief manufactures and trade consist in cotton habits, which are called *Quaqua gowns*, and are made of five or six breadths sewed together. One of the fundamental laws of this country is, that every one is obliged to continue all his life-time in the condition in which he was born; so that one whose father was a fisherman, for instance, can never become any thing else but a fisherman, and so of all other trades and professions.

The Gold-coast had its name given it by the Portuguese, from the immense quantity of that precious metal it produces: the same reason has made all the other nations of Europe retain the same appellation. According to the best charts, the situation of the Gold-coast is between 4° 30' and 8° north latitude, and 16° and 8° 4' of longitude, beginning at the river

Guinea.

Ankobar, and extending to the Rio Volta, that is, about 130 leagues from west to east. The beginning of the Gold-coast, however, is placed by many at Rio de Suero da Colla, near Iknui, that being the first place where gold is found; and the end at Lay, in the country of Lampi, three or four leagues from Akra, because there the gold is procured but accidentally, from a people called *Anaho*, inhabiting the more distant interior country.

This coast contains a variety of different kingdoms and states, viz. Adomir, called likewise *Saku*, and *Avina*: Axim, Ankobar, Adom, likewise called *Little Inkassan*, or *Warshe*; Jabi, or Jabs; Commendo, or Guaflo; Fetu, Sabo, Fantin, Ackron, Agonna, or Anguirra; Amra, or Aquambus, Lubbadé, and Ningó, or Lampi. Each of the above divisions, provinces, or kingdoms, have one, two, or more towns or villages on the sea-coast, between or under the European forts and settlements. Eight of them are real monarchies, having their own proper kings, who, before the arrival of the Europeans, were called *captains*; the rest are republics, governed by magistrates, who are subject to the laws, and periodical changes. Upon the river Cobre or Ankobar, and in the country of that name, which is properly the first country of the Gold-coast, there are a number of towns, in the three provinces of Ankobar, Aborrel or Abocro, and Eguira. The first is a monarchy; the two latter republics. For a number of years the Dutch had a fort at Eguira; and their gold trade, besides what they drew from the neighbouring countries, was very considerable, this canton having its own proper mines; but lost all their footing in the country by a quarrel with the negroes.

NEW GUINEA, a long and narrow island of the East Indies, very imperfectly known. It was supposed to be connected with New-Holland, until Captain Cook discovered the strait which separates them. New Guinea, including Papua, its north-western part, (which according to Bougainville's conjecture is separated from it by a strait) reaches from the equator to the twelfth degree of south latitude, and from 13° to 150 deg. east longitude; in one part it does not appear to be above fifty miles broad. It was first visited by an European ship in 1529. Saavedra, a Portuguese, who made the discovery of the north-west part of this country, called it *Terra de Papua*; or *Papua*. Van Schouten, a Dutch discoverer, afterwards gave the name of *New-Guinea* to its south-western part. Admiral Roggewain also touched here; and before him Dampier, 1st January 1700. Captain Cook made the coast of New-Guinea, in latitude 6 deg. 15 min. longitude 138. east, on the 3d of September, and landed in the pinnace, accompanied by Mr Banks, Doctor Solander, nine of the ship's crew; and servants well armed, and leaving two seamen to take care of the boat advanced some little way up the country; but coming to the skirts of a thick wood, they judged it prudent to proceed no further, lest they should fall into an ambuscade of the natives, and their retreat to the boat be cut off. Having advanced about a quarter of a mile from the boat, three Indians rushed out of the wood with a hideous shout; they threw their darts, and showed such a hostile disposition, that the party, to prevent the destruction of these

these people, returned to the boat, as they had no intention forcibly to invade their country, either to gratify their appetites or curiosity, and it was evident nothing could be done upon friendly terms. When they got on board the boat, they rowed along the shore, and the number of Indians assembled seemed to be between sixty and a hundred. They made much the same appearance as the New-Hollanders, being stark naked, and their hair cropped short. All the while they were shouting defiance, and throwing something out of their hand which burnt exactly like gun-powder, but made no report; what these fires were, or for what purpose intended, could not be guessed at; those who discharged them had in their hands a short piece of stick, possibly a hollow cane, which they swung sideway from them, and immediately fire and smoke issued, exactly resembling the discharge of a musket, and of no longer duration. This wonderful phenomenon was observed from the ship; and the deception was so great, that the people on board thought they had fire-arms, and even in the boat, if they had not been so near as that, they must have heard the report, if there had been any, they should have thought they had been firing volleys. After looking at them attentively some time, without making any notice of their flashing and vociferation, the sailors fired some muskets over their heads. Upon hearing the balls rattle among the trees, they walked leisurely away, and the boat returned to the ship. Upon examining some weapons which the natives had thrown, they were found to be light darts, about four feet long, very ill made, of a reed or bamboo cane, and pointed with hard wood, in which there were many barbs. They were discharged with great force, for at sixty yards distance they went beyond the party; but in what manner they were thrown could not be exactly seen. * But the general opinion was, that they were thrown with a flick in the manner practised by the New-Hollanders.

The land here is very low, as is every other part of the coast; but it is covered with a luxuriance of wood and herbage that can scarcely be conceived. Here the cocoa-nut, plantain, and bread-fruit, flourish in the highest perfection.

GUINEA is also the name of a British gold coin, value 1 l. 1 sh. Sterling.

GUINEA Hen, in ornithology. See NUMIDIA.

GUINEA-Pig, in zoology. See MUS.

GUIPUSCOA, the north-east division of the province of Biscay in Spain, situated on the confines of Navarre.

GUISE, small town of France, in Picardy, and in Tierache, with a very strong castle, and the title of a duchy. It is seated on the river Ouse, in E. Lon. 3. 42. N. Lat. 49. 54.

GUISE (Henry) of Lorraine, duke of Guise, (eldest son of Francois of Lorraine duke of Guise) memorable in the history of France as a gallant officer; but an imperious, turbulent, seditious subject, who placed himself at the head of an armed force, and called his rebel band, The League. The plan was formed by the cardinal, his younger brother; and under the pretext of defending the Roman Catholic religion, the king Henry III. and the freedom of the state, against the design of the Huguenots, or French

Protestants, they carried on a civil war, massacred the Huguenots, and governed the king, who forbid his appearance at Paris: but Guise now became an open rebel, entered the city against the king's express order, and put to the sword all who opposed him; the streets being barricaded to prevent his progress, this fatal day is called in the French history, The day of the barricades. Masters of Paris, the policy of the Guises failed them: for they suffered the king to escape to Blois, though he was defeated in his palace at Paris by his very guards. At Blois, Henry convened an assembly of the states of France; the duke of Guise had the boldness to appear to a summons sent him for that purpose; a forced reconciliation took place between him and the king, by the advice of this assembly; but it being accidentally discovered, that Guise had formed a plan to dethrone the king, that weak monarch, instead of resolutely bringing him to justice, had him privately assassinated, December 23, 1558, in the 38th year of his age. His brother the cardinal shared the same fate the next day.

GUITTAR, GUITARRA, a musical instrument of the stringed kind, with five double rows of strings; of which those that are bass are in the middle, except it be for the burthen, an octave lower than the fourth.—This instrument was first used in Spain, and by the Italians. In the former country it is still greatly in vogue. There are few of that nation who cannot play on the guitar; and with this instrument they serenade their mistresses at night. At Madrid, and other cities in that country, it is common to meet in the streets young men equipped with a guitar and a dark lantern, who, taking their station under the windows, sing, and accompany their voices with this instrument; and there is scarce an artificer or day-labourer in any of the cities or principal towns, who does not entertain himself with his guitar.

GULES, in heraldry, a corruption of the French word *gueules*, which in this science signifies *red*, and is represented in engraving by perpendicular lines. It may serve of itself to denote martial prowess, boldness, and hardiness: for the ancients used this colour to make themselves terrible to their enemies, to stir up magnanimity, and to prevent the seeing of blood, by the likeness of the colours; for which reason perhaps it is used by the English. But, according to G. Leigh, if this tincture is compounded with

Or.	} it signifies	Desire.
Arg.		Envy.
Azu.		Ardour.
Ver.		Strength.
Pur.		Justice.
Sab.		Weariness.

This colour is by the generality of the English heralds ranked before azure; but French heralds, N. Upton and his followers, prefer azure to it.

GULF, in ichthyology. See LARUS.

GULF, a broad and capacious bay comprehended between two promontories, and sometimes taking the name of a *sea* when it is very extensive; but particularly when it only communicates with the sea by means of a strait. Such are the Euxine or Black Sea, otherwise called the *Gulf of Constantinople*; the Adriatic Sea, called also the *Gulf of Venice*; the gulf of Sidra near Barbary; and the gulf of Lions near France. All these gulfs

Gum.

gulfs are in the Mediterranean. There are, besides the gulf of Mexico, the gulf of St Lawrence, and the gulf of California, which are in North America. There are also the gulf of Persia, otherwise called the *Red Sea*, between Persia and Arabia; the gulf of Bengal in India; and the gulfs of Cochinchina and Kamtschatka, near the countries of the same name. See 2d Plate CXVI.

The word comes from the French *golfé*, and that from the Italian *golfo*, which signify the same. Some deduce these further from the Greek γολφός; which Guishart again derives from the Hebrew גול, *gob*. Du Cange derives them from the barbarous Latin *gulfum*, or *gulfus*, which signify the same thing.

GUM (*Gumma*), in medicine, is a tumour arising out of the substance of a bone; it is so soft as to yield to the finger. When these tumours are harder they are called *tophi*; when harder still, they receive the name of *nodos*; but the hardest tumours in bones are *exostoses*. In venereal patients such tumours often happen on the head, and even in the middle of the most solid bones. They seem to be produced when the vessels running between the bony laminae, being either obstructed or inflamed, are dilated, and so raise the incumbent laminae. Perhaps the bone degenerates too into a morbid softness. A softness of the bones sometimes succeeds abscesses of the adjacent parts; and sometimes the origin of the disorder is lodged in the substance of the bone, especially in the lues venerea; gummata have, however, been discovered, when no such adequate cause could be observed.

GUM (*Gummi*), is a concrete vegetable juice, of no particular smell or taste, becoming viscous and tenacious when moistened with water; totally dissolving in water into a liquid, more or less glutinous in proportion to the quantity of the gum; not dissolving in vinous spirits or in oils; burning in the fire to a black coal, without melting or catching flame; suffering no dissipation in the heat of boiling water.

The true gums are gum arabic, gum tragacanth, gum fenega, the gum of cherry and plum trees, and such like. All else have more or less of resin in them.

The virtues of gums are similar to all mucilaginous substances in general, vegetable and animal; the more tenacious, glutinous, vegetable productions are called *gums*, those that are less so are *mucilages*. The first distil naturally from trees, the second are the produce of art.

Gum *Arabic*, called also *Gum Acanthinum*, *Gum Thebaicum*, *Gum Serapionis*, and the true *Gum Acacia*. It exudes from the Egyptian acacia, or thorn-tree, whose fruit affords the inspissated juice of that name. It is brought from Turkey in small irregular masses, of a clear whitish, or very pale yellow colour.

The gum fenega is generally sold for it; but they are thus distinguished: the gum arabic is in whitish transparent pieces, and is dry and brittle; but the gum fenega is clammy, tenacious, rougher, of a deeper colour, and in larger pieces.

The gum does not dissolve in spirit, nor in oil: yet when it is softened with water into a mucilage, it is easily miscible with both; also with resins, and renders them miscible with water. Dr Grew was used to mix essential oil with water by means of gum arabic; and in

the Lond. Med. Obs. and Inq. vol. i. a variety of experiments are inserted, by which it appears that oils both expressed and distilled, resins, balsams, &c. may by the same means be mixed uniformly with water or with spirit. Alkaline salts both fixed and volatile, though they render pure oil miscible with water, prevent the mixture of gum with oil. Acids do not in the least prevent the effect of the gum in this particular.

Animal glues have the general qualities of the vegetable gums; with this difference, that the former are more nutritive, and apt to run into a putrid state. Considered as the subjects of chemistry, their difference is very great: those of the animal kind are changed by fire into a volatile alkaline salt, and a fetid oil; the vegetable into an acid liquor, and a very minute portion of oily matter considerably less fetid than the former.

The medical character of gum arabic is its glutinous quality, in consequence of which it serves to incrassate and obtund thin acrid humours, so proves useful in tickling coughs, alvine fluxes, hoarsenesses, in fluxes of the belly with gripes, and where the mucus is abraded from the bowels or from the urethra. In a dysuria the true gum arabic is more cooling than the other simple gums, so should be preferred.

One ounce of gum arabic renders a pint of water considerably glutinous; four ounces gives it a thick syrupy consistence: but for mucilage, one part gum to two parts water is required; and for some purposes an equal proportion will be necessary.

In Dr Percival's Essays we have the following curious account, by Mr Henry, of the faculty which this gum hath of dissolving and keeping suspended in water not only resinous but also other substances, which should seem not likely to be at all affected by it. Vol. I. 319.

"One scruple of balsam of tolu, rubbed with half an ounce of distilled rain-water, added gradually to it, for 15 minutes, formed a mixture, which on standing about a minute subsided, but re-united by shaking: being set by a few days, the balsam became a concrete mass, not again miscible by shaking up the bottle. The same quantity required more trituration to mix it with common pump-water. One scruple of the same, rubbed with 15 grains of gum arabic, was nearly as long in perfectly uniting with half an ounce of distilled water, as that without the gum. This was perhaps owing to the latter piece being more resinous; however, though on long standing there was a small sediment, it immediately reunited a week after by agitation. Fifteen grains of balsam capivi united very smoothly with half an ounce of distilled water, by the medium of three grains of gum arabic. Five grains of the gum were not so effectual with pump-water. Balsam Peru ten drops, with gum arabic three grains, distilled water half an ounce, formed a neat white emulsion, but with common water a very unequal mixture. Gum myrrh powdered, that there might be no difference in the several quantities used, half a scruple, dissolved readily with gum arabic three grains, in both kinds of water, and even mixed with them by longer trituration without any medium, but more easily with distilled than common spring water. Olibanum, mastich, gum guaiacum, and galbanum, may likewise be mixed with water by rubbing, without any gum arabic

bic or egg. The spring-water made use of in these experiments was very aluminous.

"In the making of all the saline preparations, when any considerable quantities of water are used, distilled or pure rain or river water is greatly to be preferred: for the calcareous, aluminous, and selenitical matter, which so much abounds in moist spring water, will render any salt dissolved in it very impure."

"The solution of crude mercury with mucilage of gum arabic being so easily accomplished; and it being very disagreeable to many patients, and to some almost impossible, to swallow pills, boluses, or electuaries; I was induced to try whether calomel, cinnabar, and the other heavy and metalline bodies commonly administered only under these forms, might not by the same means be rendered miscible with water, so as to be given more agreeably in a liquid form. I accordingly rubbed ten grains of cinnabar of antimony and a scruple of gum arabic, with a sufficient quantity of distilled water to form a mucilage, and added a drachm of simple syrup, and three drachms more of water. This makes an agreeable little draught; and having stood about half an hour without depositing any sediment, I added three drachms more of water to it; and notwithstanding the mucilage was rendered so much more dilute, very little of the cinnabar subsided, even after it had stood some days.

"Steel simply prepared, and prepared tin, were both mixed with water by their own weight of gum arabic, and remained suspended, except a very small portion of each, which was not reduced to a sufficiently fine powder.

"Five grains of calomel were mixed with two drachms of distilled water, and half a drachm of simple syrup, by means of five grains of gum arabic, which kept it sufficiently suspended: a double quantity of the gum preserved the mixture uniform still longer. In this form it will be much more easily given to children, than in syrups, conserves, &c. as a great part of it is generally wasted, in forcing those viscid vehicles into them; and it may be joined with scammony and other resinous purgatives by the same method, and of these perhaps the gum arabic would be the best corrector.

"Gum arabic likewise greatly abates the disagreeable taste of the corrosive sublimate, mixed with water instead of brandy; and (from the few trials I have made) fits easier on the stomach, and will not be so apt to betray the patient by the smell of the brandy.

Mr Plenck, who first instructed us in the method of mixing quicksilver with mucilage, observes, (and experience confirms the truth of it), that this preparation is not so apt to bring on a spitting as the *argent. viv.* mixed by any other medium, or as the saline and other mercurial preparations.—How far the theory by which he accounts for it may be just, is not of much importance; but it may perhaps be worth while to inquire whether it would not be equally effectual in preventing calomel, and the other preparations of mercury, from affecting the mouth.—If so, is it not improper, where a salivation is intended, to give emulsions with gum arabic and other mucilaginous liquors for the patient's common drink, as by that means the spitting may be retarded? And on the contrary, may it not be a useful medicine to diminish the discharge when too copious?

"The following case may in some measure serve to confirm the above observation.—A gentleman, always easily affected by mercurials, having taken about 26 grains of calomel in doses from one to three grains, notwithstanding he was purged every third day, was suddenly seized with a salivation. He spat plentifully, his breath was very fetid, teeth loose, and his gums, fauces, and the margin of his tongue, greatly ulcerated and inflamed. He was directed to use the following gargle. *R. Gum. arab. semunc. solve in aqua font. bullient. scilicet. & adde mel. rosac. unc. unam. M. st. gargar.* And to drink freely of a ptisan prepared with *aq. hord. lib. ij. gum. arabic. unc. ij. nitr. pur. drachm. ij. sacchar. alb. unc. j.*

"His purgative was repeated the succeeding morning. The next day his gums were less inflamed; but the sloughs on his tongue, &c. were still as foul: his spitting was much the same: he had drank about a pint of the ptisan.—Some *spt. vitrioli* was added to the gargle.—From this day to the fourth, he was purged every day without effect—his salivation still continued,—his mouth was no better—he had neglected the mucilaginous drink—This evening he was persuaded to drink about a pint of it which remained, and he had it repeated, and drank very freely of it that night.—On the fifth morning, the purgative was again repeated. Though it operated very little, yet the change was very surprising; his mouth was nearly well, and his pytalism greatly decreased.—The ptisan was repeated; and on the sixth day, being quite well, he was permitted to go abroad."

In Mr Hasselquist's travels we have an instance of the extraordinary nutritive virtues of this gum. "The Abyssinians, (says he), make a journey every year to Cairo, to sell the products of their country. They must travel over terrible deserts, and their journey depends as much on the weather as a voyage at sea: consequently they know as little as a seaman how long they must be on their journey; and the necessities of life may chance to fail them when the journey lasts too long. This happened to the Abyssinian caravan in the year 1740, their provisions being consumed when they had still two months to travel. They were then obliged to search for something among their merchandise, wherewith they might support nature; and found nothing more proper than gum Arabic, of which they had carried a considerable quantity along with them. This served to support above 1000 persons for two months; and the caravan at last arrived at Cairo without any great loss of people, either by hunger or diseases."

Gum Seneca, is a gum extremely resembling gum Arabic. It is brought to us from the country through which the river Seneca runs, in loose or single drops; but these are much larger than those of the gum arabic usually are; sometimes it is of the bigness of an egg, and sometimes much larger: the surface is very rough, or wrinkled; and appears much less bright than the inner substance, where the masses are broken. It has no smell, and scarce any taste. We are not acquainted with the tree which produces it. The virtues of it are the same with the gum arabic; but it is rarely used in medicine, unless as mixed with the gum arabic: the dyers and other artificers consume the great quantities of it that are annually imported hither. The negroes

negroes dissolve it in milk, and in that state make it a principal ingredient in many of their dishes, and often feed on it thus alone.

GUM Tragacanth, the gum of the tragacanth, a thorny bush growing in Crete, Asia, and Greece. This gum is of a much stronger body than either of the foregoing, and does not so perfectly dissolve in water. A dram of it will give the consistence of a syrup to a whole pint of water, which an ounce of gum arabic will scarce do. Hence it is used for forming troches and the like purposes, in preference to the other gums. In its general medicinal virtues, it agrees with gum arabic.

Other substances known by the name of *gums*, are as follow:

GUM Aloes, a preparation of aloes. See PHARMACY, n° 613.

GUM Ammoniac. See AMMONIAC.

GUM Elemi. See ELEMI.

GUM Guaiacum. See GUAIACUM.

GUM Lacca. See LACCA.

GUM, among gardeners, a kind of gangrene incident to fruit-trees of the stone-kind, arising from a corruption of the sap, which, by its viscidness, not being able to make its way through the fibres of the tree, is, by the protrusion of other juice, made to extravasate and ooze out upon the bark.

When the distemper surrounds the branch, it admits of no remedy; but when only on one part of a bough, it should be taken off to the quick, and some cowdung clapped on the wound, covered over with a linen cloth, and tied down. M. Quintinie directs to cut off the morbid branch two or three inches below the part affected.

GUMS in anatomy, the hard fleshy substance in either jaw, through which the teeth spring from the jawbone. See ANATOMY, n° 26. g.

The gums are apt to become spongy, and to separate from the teeth; but the cause is frequently a stony kind of crust, which forms itself therein, which when separated, the gums soon return to their former state, especially if rubbed with a mixture of the infusion of roses four parts, and the tincture of myrrh one part.—The scurvy is another disorder which affects the gums. This disorder, when not manifest in any other part, sometimes appears in this: indeed when a scorbutic disorder invades the whole habit, its first symptom is a putrid state of the gums.

GUN, in the military art, a fire-arm, or weapon of offence, which forcibly discharges a ball or other hard and solid matter through a cylindric tube, by means of inflamed gun-powder. See *Gun-Powder*.

The word *gun* now includes most of the species of fire-arms; pistols and mortars being almost the only ones excepted from this denomination. They are divided into great and small guns; the former including all that we also call cannon, ordnance, or artillery; the latter includes musquets, carabines, musketoons, blunderbusses, fowling-pieces, &c.

It is not known at what time these weapons were first invented. Though, comparatively speaking, the introduction of guns into the western part of the world is but of a modern date; yet it is certain that in some parts of Asia they have been used, though in a very rude and imperfect manner, for many ages.—Philo-

stratus speaks of a city near the river Hyphasis in the Indies, which was said to be impregnable, and that its inhabitants were relations of the gods, because they threw thunder and lightning upon their enemies. Hence some imagine that guns were used by the eastern nations even in the time of Alexander the Great; but however this may be, many of our modern travellers assert that they were used in China as far back as the year of Christ 85, and have continued in use ever since.

The first hint of the invention of guns in Europe, is in the works of Roger Bacon, who flourished in the 13th century. In a treatise wrote by him about the year 1280, he proposes to apply the violent explosive force of gun-powder, for the destruction of armies. In 1320, Bartholomew Schwartz, a German monk, is commonly said to have invented gun-powder; tho' it is certainly known that this composition is described by Bacon in some of his treatises long before the time of Schwartz. The following is said to have been the manner in which Schwartz invented gun-powder. Having pounded the materials for it in a mortar, which he afterwards covered with a stone; a spark of fire accidentally fell into the mortar, and set the mixture on fire: upon which the explosion blew the stone to a considerable distance. Hence it is probable that Schwartz might be taught the simplest method of applying it in war; for Bacon seems rather to have conceived the manner of using it to be by the violent effort of the flame unconfined, and which is indeed capable of producing astonishing effects*. The figure and name of mortars given to a species of old artillery, and their employment (which was throwing great stone-bullets at an elevation) very much corroborates this conjecture.

Soon after the time of Schwartz, we find guns commonly made use of as instruments of war. Great guns were first used. They were originally made of iron bars soldered together, and fortified with strong iron-hoops; some of which are still to be seen, viz. one in the tower of London, two at Woolwich, and one in the royal arsenal at Lisbon. Others were made of thin sheets of iron rolled up together, and hooped; and on emergencies they were made of leather, with plates of iron or copper. These pieces were made in a rude and imperfect manner, like the first essays of many new inventions. Stone balls were thrown out of them, and a small quantity of powder used on account of their weakness. These pieces had no ornaments, were placed on their carriages by rings, and were of a cylindric form. When or by whom they were made, is uncertain: the Venetians, however, used cannon at the siege of Claudia Jessa, now called *Chioggia*, in 1366, which were brought thither by two Germans, with some powder and leaden balls; as likewise in their wars with the Genoese in 1379. King Edward III. made use of cannon at the battle of Cressy in 1346, and at the siege of Calais in 1347. Cannon were made use of by the Turks at the siege of Constantinople, then in possession of the Christians, in 1394, and in that of 1452, that threw a weight of 100 lb. but they generally burst, either the first, second, or third shot. Louis XII. had one cast at Tours, of the same size, which threw a ball from the Bastile to Charenton. One of those famous cannon

* See *Gun-Powder*.

was taken at the siege of Dieu in 1546, by Don John de Castro; and is in the castle of St Juliao da Barra, 10 miles from Lisbon: its length is 20 feet 7 inches, diameter at the centre 6 feet 3 inches, and it discharges a ball of 100 lb. It has neither dolphins, rings, nor button; is of a curious kind of metal; and has a large Indian inscription upon it, which says it was cast in 1400.

Formerly the cannon were disguised with uncommon names; for, in 1503, Louis XII. had 12 brass cannon cast, of an extraordinary size, called after the names of the 12 peers of France. The Spanish and Portuguese called them after their saints. The emperor Charles V. when he marched before Tunis, founded the 12 Apostles. At Milan there is a 70 pounder, called the *Pimontelle*; and one at Bois-le-duc, called the *Devil*. A 60 pounder at Dover castle, called *Queen Elizabeth's pocket-pistol*. An 80 pounder in the tower of London, (formerly in Stirling castle), called *Mounts-meg*. An 80 pounder in the royal arsenal at Berlin, called the *Thunderer*. An 80 pounder at Malaga, called the *Terrible*. Two curious 60 pounders in the arsenal at Bremen, called the *Messengers of bad news*. And lastly, an uncommon 70 pounder in the castle of St Angelo at Rome, made of the nails that fastened the copper-plates which covered the ancient Pantheon, with this inscription upon it: *Ex clavis trabalibus porticus Aegrippæ*.

In the beginning of the 15th century these uncommon names were generally abolished, and the following more universal ones took place, viz.

	Pounders.	Cwt.
Cannon royal, or carthoun	= 48	about 90
Bastard cannon, or $\frac{1}{2}$ carthoun	= 36	79
$\frac{1}{2}$ carthoun	= 24	60
Whole culverins	= 18	50
Demi culverins	= 9	30
Falcon	= 6	25
Sacker	lowest fort =	5
	ordinary =	6
	largest size =	8
Basilisk	= 48	85
Serpentine	= 4	8
Aspic	= 2	7
Dragon	= 6	12
Syren	= 60	81
Falconet	= 3, 2, & 1	15, 10, 5.

Moyens, which carried a ball of 10 or 12 ounces, &c.

Rabinet, which carried a ball of 16 ounces.

These curious names of beasts and birds of prey were adopted, on account of their swiftness in motion, or of their cruelty; as the falconet, falcon, facker, and culverin, &c. for their swiftness in flying; the basilisk, serpentine, aspique, dragon, syren, &c. for their cruelty.

At present cannon take their names from the weight of the ball they discharge. Thus a piece that discharges a ball of 24 pounds, is called a 24 pounder; one that carries a ball of 12 pounds, is called a 12 pounder; and so of the rest, divided into the following forts, viz.

VOL. V.

Ship-guns, confiding in 42, 36, 32, 24, 18, 12, 9, 6, and 3 pounders.

Garrison-guns, in 42, 32, 24, 18, 12, 9, and 6 pounders.

Battering-guns, in 24, 18, and 12 pounders.

Field-pieces, in 12, 9, 6, 3, 2, $1\frac{1}{2}$, 1, and $\frac{1}{2}$ pounders.

Mortars are thought to have been fully as ancient as cannon. They were employed in the wars of Italy, to throw balls of red-hot iron, stones, &c. long before the invention of shells. These last are thought to be of German invention, and the use of them in war to have been taught by the following accident. A citizen of Venlo, at a certain festival celebrated in honour of the duke of Cleves, threw a number of shells, one of which fell on a house and set fire to it, by which misfortune the greatest part of the town was reduced to ashes. The first account of shells used for military purposes is in 1435, when Naples was besieged by Charles VIII. History informs us with more certainty, that shells were thrown out of mortars at the siege of Wachtendonk, in Guelderland, in 1588, by the Earl of Mansfield. Mr Malter, an English engineer, first taught the French the art of throwing shells, which they practised at the siege of Motte in 1634. The method of throwing red-hot balls out of mortars was first certainly put in practice at the siege of Stralsund in 1675 by the elector of Brandenburg; though some say in 1653 at the siege of Bremen. For the proper dimensions of guns, their weight, the metal of which they are formed, &c. see the article GUNNERY.

Muskets were first used at the siege of Rhege in the year 1521. The Spaniards were the first who armed part of their foot with these weapons. At first they were very heavy, and could not be used without a rest. They had match-locks, and did execution at a great distance. On their march, the soldiers carried only the rests and ammunition, and had boys to bear their muskets after them. They were very slow in loading; not only by reason of the unwieldiness of their pieces, and because they carried the powder and ball separate, but from the time it took to prepare and adjust the match; so that their fire was not near so brisk as ours is now. Afterwards a lighter matchlock-musquet came in use: and they carried their ammunition in bandeliers, to which were hung several little casks of wood, covered with leather, each containing a charge of powder. The balls were carried loose in a pouch, and a priming horn hanging by their side. The muskets with rests were used as late as the beginning of the civil wars in the time of Charles I. The lighter kind succeeded them, and continued till the beginning of the present century, when they also were disused, and the troops throughout Europe armed with fire-locks.

GUNELLUS, in ichthyology. See BLENNIUS.

GUNNER, an officer appointed for the service of the cannon; or one skilled to fire the guns.

In the tower of London, and other garrisons, as well as in the field, this officer carries a field staff, and a large powder-horn in a string over his left shoulder: he marches by the guns; and when there is any apprehension of danger, his field-staff is armed with match: his business is to lay the gun to paws, and to help to load and traverse her.

19 R

Master-

Gunnery.

Master GUNNER, a patent-officer of the ordinance, who is appointed to teach all such as learn the art of gunnery, and to certify to the master-general the ability of any person recommended to be one of the king's

gunners. To every scholar he administers an oath, *Gunnery.* not to serve, without leave, any other prince or state; or teach any one the art of gunnery, but such as have taken the said oath.

G U N N E R Y,

IS the art of charging, directing, and exploding fire arms, as cannons, mortars, muskets, &c. to the best advantage.—As this art depends greatly on having the guns and shot of a proper size and figure, and well adapted to each other, it hence follows that the proper dimensions, &c. of cannon and small arms come properly to be considered under the present article.

SECT. I. *History of Gunnery.*

History.

THE ancients, who knew not the use of gun-powder and fire-arms, had, notwithstanding, machines which were capable of discharging stones, darts, and arrows, with great force. These were actuated chiefly by the elastic force of ropes, or of strong springs, and required a great number of men to work them; for which reason, the explosion of gun-powder, as acting instantaneously, and seemingly with irresistible force, seemed to be a most proper succedaneum for all the powers by which the military engines in former times were actuated. It soon appeared, however, that this force was not very easily applied. Though the experiment of Bartholomew Schwartz, mentioned under the article Gun, had given a good hint towards this application in a successful manner, yet the violent reaction of the inflated powder on the containing vessels rendered them very apt to burst, to the great danger of those who stood near them. The gun-powder in those days, therefore, was much weaker than it is now made; tho' this proved a very insufficient remedy for the inconvenience above-mentioned. It was also soon discovered, that iron bullets of much less weight than stone ones would be more efficacious if impelled by greater quantities of stronger powder. This occasioned an alteration in the matter and form of the cannon, which were now cast of brass. These were lighter and more manageable than the former, at the same time that they were stronger in proportion to their bore. Thus they were capable of enduring greater charges of a better powder than what had been formerly used; and their iron bullets, (which were from 40 to 60 pounds weight, being impelled with greater velocities, were more effectual than the heaviest stones could ever prove. This change took place about the latter end of the 15th century.

By this means powder compounded in the manner now practised over all Europe came first in use. But the change of the proportion of materials was not the only improvement it received. The method of graining it is undoubtedly a considerable advantage. At first the powder was always in the form of fine meal, such as it was reduced to by grinding the materials together. It is doubtful whether the first graining of powder was intended to increase its strength, or only to render it more convenient for filling into small charges and the charging of small arms, to which alone it was applied for many years, whilst meal-pow-

der was still made use of for cannon. But at last the additional strength which the grained powder was found to acquire from the free passage of the air between the grains, occasioned the meal-powder to be entirely laid aside.

For the last two hundred years, the formation of cannon hath been very little improved; the best pieces of modern artillery differing little in their proportions from those used in the time of Charles V. Indeed lighter and shorter pieces have been often proposed and essayed; but though they have their advantages in particular cases, yet it seems now to be agreed that they are altogether insufficient for general service. But though the proportions of the pieces have not been much varied within that period, yet their use and application have undergone considerable alterations; the same ends being now accomplished by smaller pieces than what were formerly thought necessary. Thus the battering cannon now universally approved of are those formerly called *semi-cannons*, carrying a ball of 24 pounds weight; it being found by experience, that their stroke, though less violent than that of larger pieces, is yet sufficiently adapted to the strength of the usual profiles of fortification; and that the facility of their carriage and management, and the ammunition they spare, give them great advantages beyond the whole cannons formerly employed in making breaches. The method also of making a breach, by first cutting off the whole wall as low as possible before its upper part is attempted to be beat down, seems also to be a considerable modern improvement in the practical part of gunnery. But the most considerable improvement in the practice is the method of firing with small quantities of powder, and elevating the piece so that the bullet may just go clear of the parapet of the enemy, and drop into their works. By this means the bullet, coming to the ground at a small angle and with a small velocity, does not bury itself, but bounds or rolls along in the direction in which it was fired: and therefore, if the piece be placed in a line with the battery it is intended to silence, or the front it is to sweep, each shot rakes the whole length of that battery or front; and has thereby a much greater chance of disabling the defendants, and dismounting their cannon, than it would have if fired in the common manner. This method was invented by Vauban, and was by him styled *Batterie à Ricochet*. It was first put in practice in the year 1692 at the siege of Aeth.—Something similar to this was put in practice by the king of Prussia at the battle of Rossbach in 1757. He had several six-inch mortars, made with trunnions and mounted on travelling carriages, which fired obliquely on the enemy's lines and amongst their horse. They were charged with eight ounces of powder, and elevated at an angle of one degree fifteen minutes, and did great execution; for the shells rolling along the lines with

burn-

THEORY. burning fuses made the stoutest of the enemy not wait for their burling.

SECT. II. *Theory of Gunnery.*

² THE use of fire-arms had been known for a long time before any theory concerning them was attempted. The first author who wrote professedly on the right of cannon-shot was Tartalea. In 1537 he published a book, at Venice, entitled *Nova Scientia*; and afterwards another, entitled *Questiti et Inventioni diversi*, printed at the same place in 1546, in which he treats professedly on these motions. His discoveries were but few, on account of the imperfect state of mechanical knowledge at that time. However, he determined, that the greatest range of cannon was with an elevation of 45 degrees. He likewise determined, (contrary to the opinion of practitioners), that no part of the track described by a bullet was a right line; although the curvature was in some cases so little, that it was not attended to. He compared it to the surface of the sea; which, though it appears to be a plane, is yet undoubtedly incurved round the centre of the earth. He also assumes to himself the invention of the gunner's quadrant, and often gave shrewd guesses at the event of some untried methods. But as he had not opportunities of being conversant in the practice, and founded his opinions only on speculation, he was condemned by most of the succeeding writers, though often without any sufficient reason. The philosophers of those times also intermeddled in the questions hence arising; and many disputes on motion were set on foot (especially in Italy), which continued till the time of Galileo, and probably gave rise to his celebrated *Dialogues on motion*. These were published in the year 1638; but in this interval, and before Galileo's doctrine was thoroughly established, many theories of the motion of military projectiles, and many tables of their comparative ranges at different elevations, were published; all of them egregiously fallacious, and utterly irreconcilable with the motions of these bodies. Very few of the ancients indeed refrained from indulging themselves in speculations concerning the difference betwixt natural, violent, and mixed motions; although scarce any two of them could agree in their theories.

³ It is strange, however, that, during all these contests, so few of those who were intrusted with the charge of artillery thought it worth while to bring these theories to the test of experiment. Mr Robins informs us, in his Preface to the *New Principles of Gunnery*, that he had met with no more than four authors who had treated on this subject. The first of these is Collado, who has given the ranges of a falconet carrying a three-pound shot to each point of the gunner's quadrant. But from his numbers it is manifest, that the piece was not charged with its customary allotment of gun-powder. The results of his trials were, that the point-blank shot, or that in which the path of the ball did not sensibly deviate from a right line, extended 268 paces. At an elevation of one point (or $7\frac{1}{2}$ of the gunner's quadrant) the range was 594 paces; at an elevation of two points, 794 paces; at three points, 954 paces; at four, 1010; at five, 1040; and at six, 1053 paces. At the seventh point, the range fell between those of the third

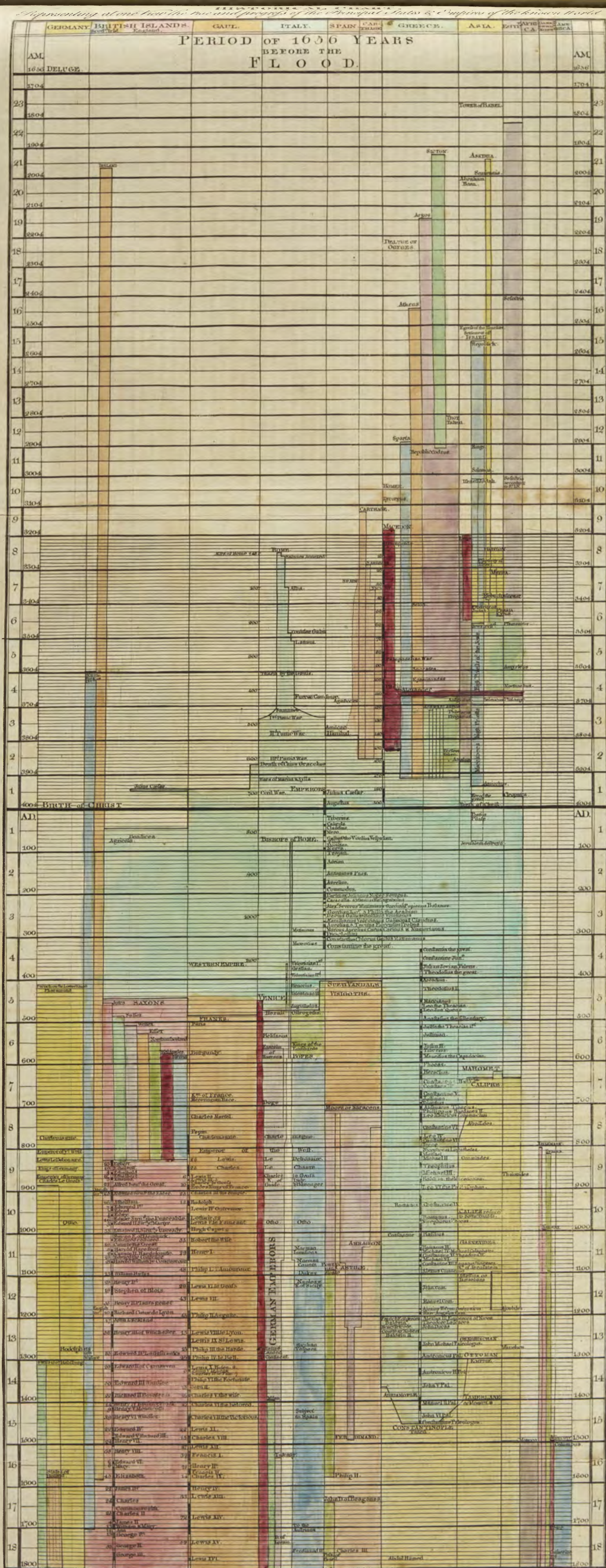
and fourth; at the eighth point, it fell between the ranges of the second and third; at the ninth point, it fell between the ranges of the first and second; at the tenth point, it fell between the point-blank distance and that of the first point; and at the eleventh point, it fell very near the piece.—The paces spoke of by this author are not geometrical ones, but common steps.

The year after Collado's treatise, another appeared on the same subject by one Bourne an Englishman. His elevations were not regulated by the points of the gunner's quadrant, but by degrees; and he ascertains the proportions between the ranges at different elevations and the extent of point-blank shot. According to him, if the extent of the point-blank shot be represented by 1, the range at 5° elevation will be $2\frac{1}{2}$, at 10° it will be $3\frac{1}{2}$, at 15° it will be $4\frac{1}{2}$, at 20° it will be $4\frac{1}{2}$, and the greatest random will be $5\frac{1}{2}$. This last, he tells us, is in a calm day when the piece is elevated to 42°; but according to the strength of the wind, and as it favours or opposes the flight of the shot, it may be from 45° to 36°.—He hath not informed us with what piece he made his trials; tho' by his proportions it seems to have been a small one. This however ought to have been attended to, as the relation between the extent of different ranges varies extremely according to the velocity and density of the bullet.

After him Eldred and Anderson, both Englishmen, published treatises on this subject. The first published his treatise in 1646, and has given the actual ranges of different pieces of artillery at small elevations all under ten degrees. His principles were not rigorously true, though not liable to very considerable errors; yet, in consequence of their deviation from the truth, he found it impossible to make some of his experiments agree with his principles.

⁴ In 1638, Galileo printed his dialogues on motion. In these he pointed out the general laws observed by nature in the production and composition of motion; and was the first who described the action and effects of gravity on falling bodies. On these principles he determined, that the flight of a cannon shot, or any other projectile, would be in the curve of a parabola, except in as far as it was diverted from that track by the resistance of the air. He has also proposed the means of examining the inequalities which arise from thence, and of discovering what sensible effects that resistance would produce in the motion of a bullet at some given distance from the piece.

Though Galileo had thus shewn, that, independent of the resistance of the air, all projectiles would, in their flight, describe the curve of a parabola; yet those who came after him, seem never to have imagined that it was necessary to consider how far the operations of gunnery were affected by this resistance. The subsequent writers indeed boldly asserted, without making the experiment, that no considerable variation could arise from the resistance of the air in the flight of shells or cannon-shot. In this persuasion they supported themselves chiefly by considering the extreme rarity of the air, compared with those dense and ponderous bodies; and at last it became an almost generally established maxim, that the flight of these bodies was nearly in the curve of a parabola.



Designed by Adam Ferguson LL.D. Professor of Moral Philosophy, in the University of Edinburgh.

EXPLANATION.

By this plan events are referred to the year of the world; and, within the proper periods, to the aeras of the Olympiads, of Nabonassar, and of Rome: but the principal reference is to the birth of Christ, marked as above by a deep black line.

The plan extends only to the Flood; the preceding period of 1056 years is left blank as above.

There being 2348 years from the Flood to the birth of Christ, the space between them is divided into 23 parts, each representing an hundred years or centuries; and all these parts, together with some centuries preceding the birth of Christ, are subdivided into tens.

The vertical columns, titled as above, are geographical divisions; and events are marked in their proper centuries and proper columns. Thus the rise of any fate, as that of Assyria, is marked in its proper geographical column, and in that place of the 21st century before Christ at which the beginning of its history is dated; from thence we trace its continuance to the end of the 7th century before Christ, when it became extinct. The building of Rome is marked about the middle of the 8th century before Christ. Its territory extends by degrees to the conquest of all Italy; next to Spain, Macedonia, &c. until it comes to extend from Britain to Egypt. It continues of this greatness until about the middle of the 5th century after Christ, when it begins to lose those provinces out of which the modern kingdoms of Europe have been formed in the order here set down. As the order in which states have risen or fallen, relatively to one another, appears on mere inspection, it will be more easily remembered than when it is conveyed in numbers alone.

The dates are taken chiefly from that comprehensive and useful work, Blair's Chronological Tables. Use has likewise been made of the Chart of Universal History, formed on a design like this, but differently executed. Compared to that chart, the present may be thought incomplete. Nor would it have been difficult for the gentleman who sketched it, to have filled it up with remarkable events, successions of kings, and lives of men; but he preferred clearness and simplicity, leaving to every person the filling up of his own plan with such articles as are most in the way of his curiosity and study. He has contented himself with a few specimens of this sort, in the succession of the Roman emperors, of the kings of England and France; and in the lives of one or two remarkable men, as in those of Tacitus the historian, and Attilla. One person may choose to fill his plan with the names of statesmen and warriors, another with scholars and men of letters. To attempt inferring all that deserve being recorded, would crowd and embarrass the whole.

As space is here employed to represent time, it is material that equal periods should be represented by equal spaces; and, if possible, that the parts of the same empire should be placed together. Both these circumstances are neglected in the Chart of Universal History.



THEORY.

5
New theory by Ander-
son.

In 1674, Mr Anderson above-mentioned published his treatise on the nature and effects of the gun; in which he proceeds on the principles of Galileo, and strenuously asserts, that the flight of all bullets is in the curve of a parabola; undertaking to answer all objections that could be brought to the contrary. The same thing was also undertaken by Mr Blondel, in a treatise published at Paris in 1683; where, after long discussion, the author concludes, that the variations from the air's resistance are so slight as scarce to merit notice. The same subject is treated of in the Philosophical Transactions, N^o 216. p. 68. by Dr Halley: and he also, swayed by the very great disproportion between the density of the air, and that of iron or lead, thinks it reasonable to believe, that the opposition of the air to large metal-shot is scarcely discernible; although in small and light shot he owns that it must be accounted for.

But though this hypothesis went on smoothly in speculation; yet Anderson, who made a great number of trials, found it impossible to support it without some new modification. For, though it does not appear that he ever examined the comparative ranges of either cannon or musquet shot, when fired with their usual velocities, yet his experiments on the ranges of shells thrown with small velocities (in comparison of those above-mentioned), convinced him that their whole tract was not parabolical. But instead of making the proper inferences from hence, and concluding the resistance of the air to be of considerable efficacy, he framed a new hypothesis; which was, that the shell or bullet, at its first discharge, flew to a certain distance in a right line, from the end of which line only it began to describe a parabola. And this right line, which he calls the *line of the impulse of the fire*, he supposes to be the same in all elevations. Thus, by assigning a proper length to this line of impulse, it was always in his power to reconcile any two shots made at different angles, let them differ as widely as we please to suppose. But this he could not have done with three shots; nor indeed doth he ever tell us the event of his experiments when three ranges were tried at one time.

6
Laws of the air's resistance laid down by Newton.

When Sir Isaac Newton's *Principia* was published, he particularly considered the resistance of the air to projectiles which moved with small velocities; but as he never had an opportunity of making experiments on those which move with such prodigious swiftness, he did not imagine that a difference in velocity could make such differences in the resistance as are now found to take place. Sir Isaac found, that, in small velocities, the resistance was increased in the duplicate proportion of the swiftness with which the body moved; that is, a body moving with twice the velocity of another of equal magnitude, would meet with four times as much resistance as the first, with thrice the velocity it would meet with nine times the resistance, &c.—This principle itself is now found to be erroneous with regard to military projectiles; though, if it had been properly attended to, the resistance of the air might even from thence have been reckoned much more considerable than was commonly done. So far, however, were those who treated this subject scientifically, from giving a proper allowance for the resistance of the atmosphere, that their theories differed most egregiously

7
Erroneous in military projectiles.

from the truth. Huygens alone seems to have attended to this principle: for, in the year 1690, he published a treatise on Gravity, in which he gave an account of some experiments tending to prove, that the track of all projectiles moving with very swift motions was widely different from that of a parabola. All the rest of the learned acquiesced in the justness of Galileo's doctrine, and very erroneous calculations concerning the ranges of cannon were accordingly given. Nor was any notice taken of these errors till the year 1716. At that time Mr Refsons, a French officer of artillery, distinguished by the number of sieges at which he had served, by his high military rank, and by his abilities in his profession, gave in a memoir to the Royal Academy, of which he was a member, importing, that, "although it was agreed, that theory joined with practice did constitute the perfection of every art; yet experience had taught him, that theory was of very little service in the use of mortars: That the works of M. Blondel had justly enough described the several parabolic lines, according to the different degrees of the elevation of the piece; but that practice had convinced him, there was no theory in the effect of gunpowder; for having endeavoured, with the greatest precision, to point a mortar agreeably to these calculations, he had never been able to establish any solid foundation upon them."

From the history of the academy, it doth not appear that the sentiments of Mr Refson's were at any time controverted, or any reason offered for the failure of the theory of projectiles when applied to use. Nothing farther, however, was done till the time of Benjamin Robins, who in 1742 published a treatise, entitled, *New Principles of Gunnery*, in which he hath treated particularly not only of the resistance of the atmosphere, but almost every thing else relating to the flight of military projectiles, and indeed advanced the theory of gunnery much nearer perfection than ever it was before.

The first thing considered by Mr Robins, and which is indeed the foundation of all other particulars relative to gunnery, is the explosive force of gunpowder. This he determined to be owing to an elastic fluid similar to our atmosphere, having its elastic force greatly increased by the heat. "If a red-hot iron (says he) be included in a receiver, and the receiver be exhausted, and gunpowder be then let fall on the iron, the powder will take fire, and the mercurial gage will suddenly descend upon the explosion; and though it immediately ascends again, it will never rise to the height it first stood at, but will continue depressed by a space proportioned to the quantity of powder which was let fall on the iron.—The same production likewise takes place when gunpowder is fired in the air: for if a small quantity of powder is placed in the upper part of a glass tube, the lower part of which is immersed in water, and the fluid be made to rise so near the top, that only a small portion of air is left in that part where the gunpowder is placed; if in this situation the communication of the upper part of the tube with the external air is closed, and the gunpowder fired, which may be easily done by means of a burning-glass, the water will in this experiment descend on the explosion, as the quicksilver did in the last; and will always continue depressed below the place at which it stood before

THEORY.

8
All these theories widely different from the truth.

9
Mr Robins first introduces a true theory.

10
His method of determining the force of gunpowder.

force

THEORY. fore the explosion. The quantity of this depression will be greater if the quantity of powder be increased, or the diameter of the tube be diminished.

“ When any considerable quantity of gunpowder is fired in an exhausted receiver, by being let fall on a red-hot iron, the mercurial gage instantly descends upon the explosion, and as suddenly ascends again. After a few vibrations, none of which (except the first) are of any great extent, it seemingly fixes at a point lower than where it stood before the explosion. But even when the gage has acquired this point of apparent rest, it still continues rising for a considerable time, although by such imperceptible degrees, that it can only be discovered by comparing its place at distant intervals: however, it will not always continue to ascend; but will rise slower and slower, till at last it will be absolutely fixed at a point lower than where the mercury stood before the explosion. The same circumstances nearly happen, when powder is fired in the upper part of an unexhausted tube, whose lower part is immerfed in water.

“ That the elasticity or pressure of the fluid produced by the firing of gunpowder is, *cæteris paribus*, directly as its density, may be proved from hence, that if in the same receiver a double quantity of powder be let fall, the mercury will subside twice as much as in the firing of a single quantity. Also the descents of the mercury, when equal quantities of powder are fired in different receivers, are reciprocally as the capacities of those receivers, and consequently as the density of produced fluid in each. But as, in the usual method of trying this experiment, the quantities of powder are so very small that it is difficult to ascertain these proportions with the requisite degree of exactness, I took a large receiver containing about 520 inches, and letting fall at once on the red-hot iron one drachm or the sixteenth part of an ounce avoirdupois of powder, the receiver being first nearly exhausted: the mercury, after the explosion, was subfided two inches exactly, and all the powder had taken fire. Then heating the iron a second time, and exhausting the receiver as before, two drachms were let down at once, which sunk the mercury three inches and three quarters; and a small part of the powder had fallen beside the iron, which (the bottom of the receiver being wet) did not fire, and the quantity which thus escaped did appear to be nearly sufficient, had it fallen on the iron, to have sunk the mercury a quarter of an inch more; in which case the two descents, viz. two inches and four inches, would have been accurately in the proportion of the respective quantities of powder; from which proportion, as was, they very little varied.

“ As different kinds of gunpowder produce different quantities of this fluid, in proportion to their different degrees of goodness, before any definite determination of this kind can take place, it is necessary to ascertain the particular species of powder that is proposed to be used. (Here Mr Robins determines in all his experiments to make use of government-powder, as consisting of a certain and invariable proportion of materials, and therefore preferable to such kinds as are made according to the fancy of private persons.)

“ This being settled, we must further premise these two principles: 1. That the elasticity of this fluid increases by heat and diminishes by cold, in the same

manner as that of the air; 2. That the density of this fluid, and consequently its weight, is the same with the weight of an equal bulk of air, having the same elasticity and the same temperature. Now from the last experiment it appears, that $\frac{1}{10}$ of an ounce avoirdupois or about 27 grains Troy of powder, sunk the gage, on its explosion, two inches; and the mercury in the barometer (standing at near 30 inches, $\frac{1}{2}$ ths of an ounce avoirdupois, or 410 grains Troy, would have filled the receiver with a fluid whose elasticity would have been equal to the whole pressure of the atmosphere, or the same with the elasticity of the air we breathe; and the content of the receiver being about 520 cubic inches, it follows, that $\frac{1}{2}$ ths of an ounce of powder will produce 520 cubic inches of a fluid possessing the same degree of elasticity with the common air; whence, an ounce of powder will produce near 575 cubic inches of such a fluid.

“ But in order to ascertain the density of this fluid, we must consider what part of its elasticity, at the time of this determination, was owing to the heat it received from the included hot-iron and the warm receiver. Now the general heat of the receiver being manifestly less than that of boiling water, which is known to increase the elasticity of the air to somewhat more than $\frac{1}{2}$ of its augmented quantity; I collect from hence and other circumstances, that the augmentation of elasticity from this cause was about $\frac{1}{2}$ of the whole: that is, if the fluid arising from the explosion had been reduced to the temperature of the external air, the descent of the mercurial gage, instead of two inches, would have been only $1\frac{1}{2}$ inch; whence 575, reduced in the proportion of five to four, becomes 460; and this last number represents the cubic inches of an elastic fluid equal in density and elasticity with common air, which are produced from the explosion of 1 ounce avoirdupois of gunpowder; the weight of which quantity of fluid, according to the usual estimation of the weight of air, is 131 grains; whence the weight of this fluid is $\frac{1}{4}$ ths of the nearly of the weight of the generating powder. The ratio of the bulk of gunpowder to the bulk of this fluid may be determined from considering that 17 drams avoirdupois of powder fill two cubic inches, if the powder be well shook together: therefore, augmenting the number last found in the proportion of 16 to 17, the resulting term 488 $\frac{1}{2}$ is the number of cubic inches of an elastic fluid, equal in density with the air produced from two cubic inches of powder: whence the ratio of the respective bulk of the powder, and of the fluid produced from it, is in round numbers as 1 to 244.”—This calculation was afterwards justified by experiments.

“ If this fluid, instead of expanding when the powder was fired, had been confined in the same space which the powder filled before the explosion; then it would have had, in that confined state, a degree of elasticity 244 times greater than that of common air; and this independent of the great augmentation this elasticity would receive from the action of the fire in that instant.

“ Hence, then, we are certain, that any quantity of powder fired in a confined space, which it adequately fills, exerts, at the instant of its explosion, against the sides of the vessel containing it, and the bodies it impels before it, a force at least 244 times greater than the

the elasticity of the common air, or, which is the same thing, than the pressure of the atmosphere; and this without considering the great addition which this force will receive from the violent degree of heat with which it is affected at that time.

“ To determine how far the elasticity of air is augmented when heated to the extremest degree of red-hot iron, I took a piece of a musquet-barrel about six inches in length, and ordered one end to be closed up entirely; but the other end was drawn out conically, and finished in an aperture of about $\frac{1}{4}$ of an inch in diameter. The tube thus fitted, was heated to the extremity of a red heat in a smith's forge; and was then immersed with its aperture downwards in a bucket of water, and kept there till it was cool; after which it was taken out carefully, and the water which had entered it in cooling was exactly weighed. The heat given to the tube at each time, was the beginning of what workmen call a *white heat*; and to prevent the rushing in of the aqueous vapour at the immersion, which would otherwise drive out great part of the air, and render the experiment fallacious, I had an iron wire filed tapering, so as to fit the aperture of the tube, and with this I always stopped it up before it was taken from the fire, letting the wire remain in till the whole was cool, when, removing it, the due quantity of water would enter. The weight of the water thus taken in at three different trials was 600 grains, 595 grains, and 600 grains, respectively. The content of the whole cavity of the tube was 796 grains of water; whence the spaces remaining unfilled in these three experiments were 186, 201, and 196 grains respectively. These spaces undoubtedly contained all the air which, when the tube was red-hot, extended thro' its whole concavity; consequently the elasticity of the air, when heated to the extreme heat of red-hot iron, was to the elasticity of the same air, when reduced to the temperature of the ambient atmosphere, as the whole capacity of the tube to the respective spaces taken up by the cooled air; that is, as 796 to 186, 201, 196; or, taking the medium of these three trials, as 796 to 194 $\frac{1}{2}$.

“ As air and this fluid appear to be equally affected by heat and cold, and consequently have their elasticities equally augmented by the addition of equal degrees of heat to each; if we suppose the heat with which the flame of fired powder is endowed, to be the same with that of the extreme heat of red-hot iron, then the elasticity of the generated fluid will be greater at the time of the explosion than afterwards, when it is reduced to the temperature of the ambient air, in the ratio of 796 to 194 $\frac{1}{2}$ nearly. It being allowed then, (which surely is very reasonable), that the flame of gunpowder is not less hot than red-hot iron, and the elasticity of the air, and consequently of the fluid generated by the explosion, being augmented in the extremity of this heat in the ratio of 194 $\frac{1}{2}$ to 796, it follows, that if 244 be augmented in this ratio, the resulting number which is 999 $\frac{1}{2}$, will determine how many times the elasticity of the flame of fired powder exceeds the elasticity of common air, supposing it to be confined in the same space which the powder filled before it was fired.—Hence then the absolute quantity of the pressure exerted by gunpowder at the moment of its explosion may be assigned; for, since the fluid then generated has an elasticity of 999 $\frac{1}{2}$, or in

round numbers 1000 times greater than that of the atmosphere, and since common air by its elasticity exerts a pressure on any given surface equal to the weight of the incumbent atmosphere with which it is in equilibrio, the pressure exerted by fired powder before it dilated itself is 1000 times greater than the pressure of the atmosphere; and consequently the quantity of this force, on a surface of an inch square, amounts to above six ton weight; which force, however, diminishes as the fluid dilates itself.

“ But though we have here supposed that the heat of gunpowder, when fired in any considerable quantity, is the same with iron heated to the extremity of red heat, or to the beginning of a white heat, yet it cannot be doubted but that the fire produced in the explosion is somewhat varied (like all other fires) by a greater or lesser quantity of fuel; and it may be presumed, that, according to the quantity of powder fired together, the flame may have all the different degrees, from a languid red heat, to that sufficient for the vitrification of metals. But as the quantity of powder requisite for the production of this last mentioned heat, is certainly greater than what is ever fired together for any military purpose, we cannot be far from our scope, if we suppose the heat of such quantities as are usually fired to be nearly the same with that of red-hot iron; allowing a gradual augmentation to this heat in larger quantities, and diminishing it when the quantities are very small.”

Having thus determined the force of the gunpowder, Mr Robins next proceeds to determine the velocity with which the ball is discharged. The solution of this problem depends on the two following principles. 1. That the action of the powder on the bullet ceases as soon as the bullet is got out of the piece. 2. That all the powder of the charge is fired and converted into elastic fluid before the bullet is sensibly moved from its place.

“ The first of these (says Mr Robins) will appear manifest when it is considered how suddenly the flame will extend itself on every side, by its own elasticity, when it is once got out of the mouth of the piece; for by this means its force will then be dissipated, and the bullet no longer sensibly affected by it.

“ The second principle is indeed less obvious, being contrary to the general opinion of almost all writers on this subject. It might however be sufficient for the proof of this position, to observe the prodigious compression of the flame in the chamber of the piece. Those who attend to this circumstance, and to the easy passage of the flame through the intervals of the grains, may soon satisfy themselves, that no one grain contained in that chamber can continue for any time uninfused, when thus surrounded and pressed by such an active fire. However, not to rely on mere speculation in a matter of so much consequence, I considered, that if part only of the powder is fired, and that successively; then by laying a greater weight before the charge, (suppose two or three bullets instead of one), a greater quantity of powder would necessarily be fired, since a heavier weight would be a longer time in passing through the barrel. Whence it should follow, that two or three bullets would be impelled by a much greater force than one only. But the contrary to this appears by experiment; for firing one, two, and

IT
Prodigious
power of
fired pow-
der.

12
Mr Ro-
bins's me-
thod of de-
termining
the veloci-
ties of balls.

13
Instantane-
ous firing
of powder.

THEORY. and three bullets laid contiguous to each other with the same charge respectively, I have found that their velocities were not much different from the reciprocal of their subduplicate quantities of matter; that is, if a given charge would communicate to one bullet a velocity of 1700 feet in a second, the same charge would communicate to two bullets a velocity from 1250 to 1300 feet in a second, and to three bullets a velocity from 1050 to 1110 feet in the same time. From hence it appears, that, whether a piece is loaded with a greater or less weight of bullet, the action is nearly the same; since all mathematicians know, that if bodies containing different quantities of matter are successively impelled through the same space by the same power acting with a determined force at each point of that space; then the velocities given to these different bodies will be reciprocally in the subduplicate ratio of their quantities of matter. The excess of the velocities of the two and three bullets above what they ought to have been by this rule, (which are that of 1200 and 980 feet in a second) undoubtedly arises from the flame, which, escaping by the side of the first bullet, acts on the surface of the second and third.

14
Why some powder is blown out of the mouth of a cannon without being fired.

"Now, this excess has in many experiments been imperceptible, and the velocities have been reciprocally in the subduplicate ratios of the number of bullets, to sufficient exactness; and where this error has been greater, it has never arisen to an eighth part of the whole: but, if the common opinion was true, that a small part only of the powder fires at first, and other parts of it successively as the bullet passes through the barrel, and that a considerable part of it is often blown out of the piece without firing at all; then the velocity which three bullets received from the explosion ought to have been much greater than we have found it to be.—But the truth of this second postulate more fully appears from those experiments, by which it is shewn, that the velocities of bullets may be ascertained to the same exactness when they are acted on through a barrel of four inches in length only, as when they are discharged from one of four feet.

"With respect to the grains of powder which are often blown out unfired, and which are always urged as a proof of the gradual firing of the charge, I believe Diego Ufano, a person of great experience in the art of gunnery, has given the true reason for this accident; which is, that some small part of the charge is often not rammed up with the rest, but is left in the piece before the wad, and is by this means expelled by the blast of air before the fire can reach it. I must add, that, in the charging of cannon and small arms, especially after the first time, this is scarcely to be avoided by any method I have yet seen practised. Perhaps, too, there may be some few grains in the best powder, of such an heterogeneous composition as to be less susceptible of firing; which, I think, I have myself observed: and these, though they are surrounded by the flame, may be driven out unfired.

15
Demonstration of the force of fired powder on the ball. Plate CXLIV.
fig. 4.

"These postulates being now allowed to be just, let AB represent the axis of any piece of artillery, A the breech, and B the muzzle; DC the diameter of its bore, and DEGC a part of its cavity filled with powder. Suppose the ball that is to be impelled to lie with its hinder surface at the line GE; then the pressure exerted at the explosion on the circle of which

GE is the diameter, or, which is the same thing, the pressure exerted in the direction FB on the surface of the ball, is easily known from the known dimensions of that circle. Draw any line FH perpendicular to FB, and AI parallel to FH; and through the point H, to the asymptotes IA and AB, describe the hyperbola KHQ; then, if FH represents the force impelling the ball at the point F, the force impelling the ball at any other point as at M, will be represented by the line MN, the ordinate to the hyperbola at that point. For when the fluid impelling the body along has dilated itself to M, its density will be then to its original density in the space DEGC reciprocally as the spaces through which it is extended; that is, as FA to MA, or as MN to FH; but it has been shewn, that the impelling force or elasticity of this fluid is directly as its density; therefore, if FH represents the force at the point F, MN will represent the like force at the point M.

"Since the absolute quantity of the force impelling the ball at the point F is known, and the weight of the ball is also known, the proportion between the force with which the ball is impelled and its own gravity is known. In this proportion take FH to FL, and draw LP parallel to FB; then, MN the ordinate to the hyperbola in any point will be to its part MR, cut off by the line LP, as the impelling force of the powder in that point M to the gravity of the ball; and consequently the line LP will determine a line proportional to the uniform force of gravity in every point; whilst the hyperbola HNQ determines in like manner such ordinates as are proportional to the impelling force of the powder in every point; whence by the 39th Prop. of lib. 1. of Sir Isaac Newton's Principia, the areas FLPB and FHQB are in the duplicate proportion of the velocities which the ball would acquire when acted upon by its own gravity through the space FB, and when impelled through the same space by the force of the powder. But since the ratio of AF to AB and the ratio of FH to FL are known, the ratio of the area FLPB to the area FHQB is known; and thence its subduplicate. And since the line FB is given in magnitude, the velocity which a heavy body would acquire when impelled through this line by its own gravity is known; being no other than the velocity it would acquire by falling through a space equal to that line: find then another velocity to which this last mentioned velocity bears the given ratio of the subduplicate of the area FLPB to the area FHQB; and this velocity thus found is the velocity the ball will acquire when impelled thro' the space FB by the action of the inflamed powder.

"Now to give an example of this: Let us suppose AB, the length of the cylinder, to be 45 inches; its diameter DC, or rather the diameter of the ball, to be $\frac{1}{4}$ of an inch; and AF, the extent of the powder, to be $2\frac{1}{2}$ inches; to determine the velocity which will be communicated to a leaden bullet by the explosion, supposing the bullet to be laid at first with its surface contiguous to the powder.

"By the theory we have laid down, it appears, that at the first instant of the explosion the flame will exert, on the bullet lying close to it, a force 1000 times greater than the pressure of the atmosphere. The medium pressure of the atmosphere is reckoned equal

to a column of water 33 feet in height; whence, lead being to water as 11,345 to 1, this preffure will be equal to that of a column of lead 34.9 inches in height. Multiplying this by 1000, therefore, a column of lead 34900 inches (upwards of half a mile) in height, would produce a preffure on the bullet equal to what is exerted by the powder in the first instant of the explosion; and the leaden ball being $\frac{1}{2}$ of an inch in diameter, and consequently equal to a cylinder of lead of the same base half an inch in height, the preffure at first acting on it will be equal to 34900×2 , or 69800 times its weight: whence FL to FH as 1 to 69800; and FB to FA as $45 - 2\frac{1}{2}$; or $42\frac{1}{2}$ to $2\frac{1}{2}$; that is, as 339 to 21; whence the rectangle FLPB is to the rectangle AFHS as 339 to 21×69800 , that is, as 1 to 4324—And from the known application of the logarithms to the mensuration of the hyperbolic spaces it follows, that the rectangle AFHS is to the area FHQB as 43,429, &c.

is to the tabular logarithm of $\frac{AB}{AF}$; that is, of $\frac{15.7}{11.7}$ which is 1,2340579; whence the ratio of the rectangle FLPB to the hyperbolic area FHQB is compounded of the ratios of 1 to 4324—and of 1,2340579; which together make up the ratio of 1 to 12263, the subduplicate of which is the ratio of 1 to 110.7; and in this ratio is the velocity which the bullet would acquire by gravity in falling thro' a space equal to FB, to the velocity the bullet will acquire from the action of the powder impelling it thro' FB. But the space FB being $42\frac{1}{2}$ inches, the velocity a heavy body will acquire in falling through such a space is known to be what would carry it nearly at the rate of 15.07 feet in a second; whence the velocity to which this has the ratio of 1 to 110.7 is a velocity which would carry the ball at the rate of 1668 feet in one second. And this is the velocity which, according to the theory, the bullet in the present circumstances would acquire from the action of the powder during the time of its dilatation.

“Now this velocity being once computed for one case, is easily applied to any other; for if the cavity DEGC left behind the bullet be only in part filled with powder, then the line HF, and consequently the area FHQB will be diminished in the proportion of the whole cavity to the part filled. If the diameter of the bore be varied, the lengths AB and AF remaining the same, then the quantity of powder and the surface of the bullet which it acts on, will be varied in the duplicate proportion of the diameter, but the weight of the bullet will vary in the triplicate proportion of the diameter; wherefore the line FH, which is directly as the absolute impelling force of the powder, and reciprocally as the gravity of the bullet, will change in the reciprocal proportion of the diameter of the bullet. If AF, the height of the cavity left behind the bullet, be increased or diminished, the rectangle of the hyperbola, and consequently the area corresponding to ordinates in any given ratio, will be increased or diminished in the same proportion. From all which it follows, that the area FHQB, which is in the duplicate proportion of the velocity of the impelled body, will be directly as the logarithm $\frac{AB}{AF}$ (where AB represents the length of the barrel, and AF the length of the cavity left behind the bullet); also directly as the part of

that cavity filled with powder; and inversely, as the diameter of the bore, or rather of the bullet; likewise directly as AF, the height of the cavity left behind the bullet. Consequently the velocity being computed as above, for a bullet of a determined diameter, placed in a piece of a given length, and impelled by a given quantity of powder, occupying a given cavity behind that bullet; it follows, that, by means of these ratios, the velocity of any other bullet may be thence deduced; the necessary circumstances of its position, quantity of powder, &c. being given. Where note, That in the instance of this supposition, we have supposed the diameter of the ball to be $\frac{1}{2}$ of an inch; whence the diameter of the bore will be something more, and the quantity of powder contained in the space DEGC, will amount exactly to twelve penny-weight, a small wad of tow included.

“In order to compare the velocities communicated to bullets by the explosion, with the velocities resulting from the theory by computation; it is necessary that the actual velocities with which bullets move should be discovered. The only methods hitherto practised for this purpose, have been either by observing the time of the flight of a shot through a given space, or by measuring the range of a shot at a given elevation; and thence computing, on the parabolic hypothesis, what degree of velocity would produce this range.—The first method labours under this insurmountable difficulty, that the velocities of these bodies are often so swift, and consequently the time observed is so short, that an imperceptible error in that time, may occasion an error in the velocity thus found of 2, 3, 4, 5, or 600 feet, in a second. The other method is so fallacious, by reason of the resistance of the atmosphere (to which inequality the first is also liable), that the velocities thus assigned may not perhaps be the tenth part of the actual velocities fought.

“The simplest method of determining this velocity is by means of the instrument represented Plate CXLII. fig. 5. where ABCD represents the body of the machine composed of the three poles B, C, D, spreading at bottom, and joining together at the top A; being the same with what is vulgarly used in lifting and weighing very heavy bodies, and is called by workmen the *triangles*. On two of these poles, towards their tops, are screwed on the sockets RS; and on these sockets the pendulum EFGHIK is hung by means of its cross-piece EF, which becomes its axis of suspension, and on which it must be made to vibrate with great freedom. The body of this pendulum is made of iron, having a broad part at bottom, and its lower part is covered with a thick piece of wood GKI, which is fastened to the iron by screws. Something lower than the bottom of the pendulum there is a brace OP, joining the two poles to which the pendulum is suspended; and to this brace there is fastened a contrivance MNU, made with two edges of steel, bearing on each other in the line UN, something in the manner of a drawing-pen; the strength with which these edges press on each other being diminished or increased at pleasure by means of a screw Z going through the upper piece. There is fastened to the bottom of the pendulum a narrow ribbon LN, which passes between these steel edges, and which afterwards, by means of an opening cut in the lower piece of steel, hangs loosely down, as at W.

This

16
Machine
discovering
the veloci-
ties of bul-
lets.

THEORY.

17
Method of
using the
machine.

"This instrument thus fitted, if the weight of the pendulum be known, and likewise the respective distances of its centre of gravity, and of its centre of oscillation from its axis of suspension, it will thence be known, what motion will be communicated to this pendulum by the percussion of a body of a known weight moving with a known degree of celerity, and striking it in a given point; that is, if the pendulum be supposed at rest before the percussion, it will be known what vibration it ought to make in consequence of such a determined blow; and, on the contrary, if the pendulum, being at rest, is struck by a body of a known weight, and the vibration, which the pendulum makes after the blow, is known, the velocity of the striking body may from thence be determined.

"Hence then, if a bullet of a known weight strikes the pendulum, and the vibration, which the pendulum makes in consequence of the stroke, be ascertained; the velocity, with which the ball moved, is thence to be known.

"Now the extent of the vibration, made by the pendulum after the blow, may be measured to great accuracy by the ribbon LN. For let the pressure of the edges UN on the ribbon be so regulated by the screw Z, that the motion of the ribbon between them may be free and easy, though with some minute resistance; then settling the pendulum at rest, let the part LN between the pendulum and the edges be drawn strait, but not strained, and fix a pin in that part of the ribbon which is then contiguous to the edges: let now a ball impinge on the pendulum; then the pendulum swinging back will draw out the ribbon to the just extent of its vibration, which will consequently be determined by the interval on the ribbon between the edges UN and the place of the pin.

"The weight of the whole pendulum, wood and all, was 56 lb. 3 oz. its centre of gravity was 52 inches distant from its axis of suspension, and 200 of its small swings were performed in the time of 253 seconds; whence its centre of oscillation (determined from hence) is 62 $\frac{3}{4}$ inches distant from that axis. The centre of the piece of wood GKI^H is distant from the same axis 66 inches.

"In the compound ratio of 66 to 62 $\frac{3}{4}$, and 66 to 52, take the quantity of matter of the pendulum to a 4th quantity, which will be 42 lb. $\frac{3}{4}$ oz. Now geometers will know, that if the blow be struck on the centre of the piece of wood GKI^H, the pendulum will resist to the stroke in the same manner as if this last quantity of matter only (42 lb. $\frac{3}{4}$ oz.) was concentrated in that point, and the rest of the pendulum was taken away: whence, supposing the weight of the bullet impinging in that point to be the $\frac{1}{10}$ of a pound, or the $\frac{1}{100}$ of this quantity of matter nearly, the velocity of the point of oscillation after the stroke will, by the laws observed in the congress of such bodies as rebound not from each other, be the $\frac{1}{10}$ of the velocity the bullet moved with before the stroke; whence the velocity of this point of oscillation after the stroke being ascertained, that multiplied by 505 will give the velocity with which the ball impinged.

"But the velocity of the point of oscillation after the stroke is easily deduced from the chord of the arch, through which it ascends by the blow; for it is a well-known proposition, that all pendulous bodies ascend

to the same height by their vibratory motion as they would do, if they were projected directly upwards from their lowest point, with the same velocity they have in that point: wherefore, if the versed sine of the ascending arch be found, (which is easily determined from the chord and radius being given), this versed sine is the perpendicular height, to which a body projected upwards with the velocity of the point of oscillation would arise; and, consequently, what that velocity is, can be easily computed by the common theory of falling bodies.

"For instance, the chord of the arch, described by the ascent of the pendulum after the stroke measured on the ribbon, has been sometimes 17 $\frac{1}{2}$ inches; the distance of the ribbon from the axis of suspension is 71 $\frac{1}{2}$ inches; whence reducing 17 $\frac{1}{2}$ in the ratio of 71 $\frac{1}{2}$ to 66, the resulting number, which is nearly 16 inches, will be the chord of the arch through which the centre of the board GKI^H ascended after the stroke: now the versed sine of the arch, whose chord is 16 inches, and its radius 66, is 1.93939; and the velocity, which would carry a body to this height, or, which is the same thing, the velocity which a body would acquire by descending through this space, is nearly that of 3 $\frac{1}{2}$ feet in 1".

"To determine then the velocity with which the bullet impinged on the centre of the wood, when the chord of the arch described by the ascent of the pendulum, in consequence of the blow, was 17 $\frac{1}{2}$ inches measured on the ribbon, no more is necessary than to multiply 3 $\frac{1}{2}$ by 505, and the resulting number 1641 will be the feet which the bullet would describe in 1", if it moved with the velocity it had at the moment of its percussion: for the velocity of the point of the pendulum, on which the bullet struck, we have just now determined to be that of 3 $\frac{1}{2}$ feet in 1"; and we have before shewn, that this is the $\frac{1}{10}$ of the velocity of the bullet. If then a bullet weighing $\frac{1}{10}$ of a pound strikes the pendulum in the centre of the wood GKI^H, and the ribbon be drawn out 17 $\frac{1}{2}$ inches by the blow; the velocity of the bullet is that of 1641 feet in 1". And since the length the ribbon is drawn is always nearly the chord of the arch described by the ascent, (it being placed so as to differ insensibly from those chords which most frequently occur), and these chords are known to be in the proportion of the velocities of the pendulum acquired from the strokes; it follows, that the proportion between the lengths of ribbon drawn out at different times, will be the same with that of the velocities of the impinging bullets; and consequently, by the proportion of these lengths of ribbon to 17 $\frac{1}{2}$, the proportion of the velocity with which the bullets impinge to the known velocity of 1641 feet in 1", will be determined.

"Hence then is shewn, in general, how the velocities of bullets of all kinds may be found out by means of this instrument; but that those who may be disposed to try these experiments may not have unforeseen difficulties to struggle with, we shall here subjoin a few observations, which it will be necessary for them to attend to, both to secure success to their trials, and safety to their persons.

"And first, that they may not conceive the piece of wood GKI^H to be an unnecessary part of the machine, we must inform them, that if a bullet impelled

18
Cautions to
be observed
in making
these experiments.

THEORY. by a full charge of powder should strike directly on the iron, the bullet would be beaten into shivers by the stroke, and these shivers will rebound back with such violence, as to bury themselves in any wood they chance to light on, as I have found by hazardous experience; and besides the danger, the pendulum will not in this instance ascertain the velocity of the bullet, because the velocity with which the parts of it rebound is unknown.

"The weight of the pendulum, and the thickness of the wood, must be in some measure proportioned to the size of the bullets which are used. A pendulum of the weight here described will do very well for all bullets under three or four ounces, if the thickness of the board be increased to seven or eight inches for the heaviest bullets; beech is the toughest and properest wood for this purpose.

"It is hazardous standing on the side of the pendulum, unless the board be so thick, that the greatest part of the bullet's force is lost before it comes at the iron; for if it strikes the iron with violence, the shivers of it, which cannot return back thro' the wood, will force themselves out between the wood and iron, and will fly to a considerable distance.

"As there is no effectual way of fastening the wood to the iron but by screws, the heads of which must come through the board; the bullets will sometimes light on those screws, from whence the shivers will disperse themselves on every side.

"When in these experiments so small a quantity of powder is used, as will not give to the bullet a velocity of more than 400 or 500 feet in 1"; the bullet will not stick in the wood, but will rebound from it entire, and (if the wood be of a very hard texture) with a very considerable velocity. Indeed I have never examined any of the bullets which have thus rebounded; but I have found them indented by the bodies they have struck against in their rebound.

"To avoid then these dangers, to the braving of which in philosophical researches no honour is annexed; it will be convenient to fix whatsoever barrel is used, on a strong heavy carriage, and to fire it with a little slow match. Let the barrel too be very well fortified in all its length; for no barrel (I speak of musket barrels) forged with the usual dimensions will bear many of the experiments without bursting. The barrel I have most relied on, and which I procured to be made on purpose, is nearly as thick at the muzzle as at the breech; that is, it has in each place nearly the diameter of its bore in thickness of metal.

"The powder used in these experiments should be exactly weighed: and that no part of it be scattered in the barrel, the piece must be charged with a ladle in the same manner as is practised with cannon; the wad should be of tow, of the same weight each time, and no more than is just necessary to confine the powder in its proper place: the length of the cavity left behind the ball should be determined each time with exactness; for the increasing or diminishing that space will vary the velocity of the shot, although the bullet and quantity of powder be not changed. The distance of the mouth of the piece from the pendulum ought to be such, that the impulse of the flame may not act on the pendulum; this will be prevented in a common

barrel charged with $\frac{1}{4}$ an ounce of powder, if it be at the distance of 16 or 18 feet: in larger charges the impulse is sensible farther off, I have found it to extend to above 25 feet; however, between 25 and 18 feet is the distance I have usually chosen."

With this instrument, or others similar to it, Mr Robins made a great number of experiments on barrels of different lengths, and with different charges of powder. He hath given us the results of 61 of these; and having compared the actual velocities with the computed ones, his theory appears to have come as near the truth as could well be expected. In seven of the experiments there was a perfect coincidence; the charges of powder being six or twelve pennyweights; the barrels 45, 24.312, and 7.06 inches in length. The diameter of the first (marked A) was $\frac{1}{4}$ of an inch; of the second (B) was the same; and of D, $\frac{8}{32}$ of an inch. In the rest of the experiments, another barrel (C) was used, whose length was 12.375 inches, and the diameter of its bore $\frac{1}{4}$ inches.---In 14 more of the experiments, the difference between the length of the chord of the pendulum's arch shewn by the theory and the actual experiment was one-tenth of an inch over or under. This shewed an error in the theory varying according to the different lengths of the chord from $\frac{1}{17}$ to $\frac{1}{27}$ of the whole; the charges of powder were the same as in the last.---In 16 other experiments, the error was two-tenths of an inch, varying from $\frac{1}{17}$ to $\frac{1}{27}$ of the whole; the charges of powder were 6, 8, 9, or 12 pennyweights.---In seven other experiments, the error was three-tenths of an inch, varying from $\frac{1}{17}$ to $\frac{1}{27}$ of the whole; the charges of powder six, or twelve, pennyweights. In eight experiments, the difference was four-tenths of an inch, indicating an error from $\frac{1}{17}$ to $\frac{1}{27}$ of the whole; the charges being 6, 9, 12, and 24 pennyweights of powder. In three experiments, the error was five-tenths, varying from $\frac{1}{17}$ to $\frac{1}{27}$ of the whole; the charges 8 and 12 pennyweights of powder.---In two experiments the error was six-tenths, in one case amounting to something less than $\frac{1}{17}$, in the other to $\frac{1}{27}$ of the whole; the charges 12 and 36 pennyweights of powder. By one experiment the error was seven, and by another eight, tenths; the first amounting to $\frac{1}{17}$ nearly, the latter to almost $\frac{1}{27}$ of the whole: the charges of powder 6 or 12 pennyweights. The last error, however, Mr Robins ascribes to the wind. The two remaining experiments varied from the theory by 1.3 inches, somewhat more than $\frac{1}{17}$ of the whole: the charges of powder were 12 pennyweights in each; and Mr Robins ascribes the error to the dampness of the powder. In another case, he ascribes an error of six-tenths to the blast of the powder on the pendulum.

From these experiments Mr Robins deduces the following conclusions. "The variety of these experiments, and the accuracy with which they correspond to the theory, leave us no room to doubt of its certainty.---This theory, as here established, supposes, that, in the firing of gunpowder, about $\frac{1}{10}$ of its substance is converted by the sudden inflammation into a permanently elastic fluid, whose elasticity, in proportion to its heat and density, is the same with that of common air in the like circumstances; it farther supposes, that all the force exerted by gunpowder in its

19
Account of
Mr Robins's ex-
periments.

20
His conclusions from
them.

most

THEORY. most violent operations, is no more than the action of the elasticity of the fluid thus generated; and these principles enable us to determine the velocities of bullets impelled from fire-arms of all kinds, and are fully sufficient for all purposes where the force of gunpowder is to be estimated.

"From this theory many deductions may be made, of the greatest consequence to the practical part of gunnery. From hence the thickness of a piece, which will enable it to confine, without bursting, any given charge of powder, is easily determined, since the effort of the powder is known. From hence appears the inconclusiveness of what some modern authors have advanced, relating to the advantages of particular forms of chambers for mortars and cannon; for all their laboured speculations on this head are evidently founded on very erroneous opinions about the action of fired powder. From this theory too we are taught the necessity of leaving the same space behind the bullet when we would, by the same quantity of powder, communicate to it an equal degree of velocity; since, on the principles already laid down, it follows, that the same powder has a greater or less degree of elasticity, according to the different spaces it occupies. The method which I have always practised for this purpose has been by marking the rammer; and this is a maxim which ought not to be dispensed with when cannon are fired at an elevation, particularly in those called by the French *batteries à ricochet*.

"From the continued action of the powder, and its manner of expanding described in this theory, and the length and weight of the piece, one of the most essential circumstances in the well directing of artillery may be easily ascertained. All practitioners are agreed, that no shot can be depended on, unless the piece be placed on a solid platform: for if the platform shakes with the first impulse of the powder, it is impossible but the piece must also shake; which will alter its direction, and render the shot uncertain. To prevent this accident, the platform is usually made extremely firm to a considerable depth backwards; so that the piece is not only well supported in the beginning of its motion, but likewise through a great part of its recoil. However, it is sufficiently obvious, that when the bullet is separated from the piece, it can be no longer affected by the trembling of the piece or platform; and, by a very easy computation, it will be found, that the bullet will be out of the piece before the latter hath recoiled half an inch: whence, if the platform be sufficiently solid at the beginning of the recoil, the remaining part of it may be much slighter; and hence a more compendious method of constructing platforms may be found out.

"From this theory also it appears how greatly these authors have been mistaken, who have attributed the force of gunpowder, or at least a considerable part of it, to the action of the air contained either in the powder, or between the intervals of the grains: for they have supposed that air to exist in its natural elastic state, and to receive all its addition of force from the heat of the explosion. But from what hath been already delivered concerning the increase of the air's elasticity by heat, we may conclude that the heat of the explosion cannot augment this elasticity to five times its common quantity; consequently the force

arising from this cause only cannot amount to more than the 200th part of the real force exerted on the occasion.

"If the whole substance of the powder was converted into an elastic fluid at the instant of the explosion, then from the known elasticity of this fluid assigned by our theory, and its known density, we could easily determine the velocity with which it would begin to expand, and could thence trace out its future augmentations in its progress through the barrel: but as we have shewn that the elastic fluid, in which the activity of the gunpowder consists, is only $\frac{1}{3}$ of the substance of the powder, the remaining $\frac{2}{3}$ will, in the explosion, be mixed with the elastic part, and will by its weight retard the activity of the explosion; and yet they will not be so completely united as to move with one common motion; but the unelastic part will be less accelerated than the rest, and some will not even be carried out of the barrel, as appears by the considerable quantity of unctuous matter which adheres to the inside of all fire-arms after they have been used.—These inequalities in the expansive motion of the flame oblige us to recur to experiments for its accurate determination.

"The experiments made use of for this purpose were of two kinds. The first was made by charging the barrel A with 12 penny-weights of powder, and a small wad of tow only; and then placing its mouth 19 inches from the centre of the pendulum. On firing it in this situation, the impulse of the flame made it ascend through an arch whose chord was 13.7 inches; whence, if the whole substance of the powder was supposed to strike against the pendulum, and each part to strike with the same velocity, that common velocity must have been at the rate of about 2650 feet in a second.—But as some part of the velocity of the flame was lost in passing through 19 inches of air; I made the remaining experiments in a manner not liable to this inconvenience.

"I fixed the barrel A on the pendulum, so that its axis might be both horizontal, and also perpendicular to the plane HK; or, which is the same thing, that it might be in the plane of the pendulum's vibration: the height of the axis of the piece above the centre of the pendulum was six inches; and the weight of the piece, and of the iron that fastened it, &c. was 12½ lb. The barrel in this situation being charged with 12 penny-weights of powder, without either ball or wad, only put together with the rammer; on the discharge the pendulum ascended through an arch whose chord was 10 inches, or reduced to an equivalent blow in the centre of the pendulum, supposing the barrel away, it would be 14.4 inches nearly.—The same experiment being repeated, the chord of the ascending arch was 10.1 inches, which, reduced to the centre, is 14.6 inches.

"To determine what difference of velocity there was in the different parts of the vapour, I loaded the piece again with 12 penny-weights of powder, and rammed it down with a wad of tow, weighing one penny-weight. Now, I conceived that this wad being very light, would presently acquire that velocity with which the elastic part of the fluid would expand itself when uncompressed; and I accordingly found, that the chord of the ascending arch was by

2r
Experiments for determining the velocity of fired gunpowder.

THEORY. this means increased to 12 inches, or at the centre to 17.3: whence, as the medium of the other two experiments is 14.5, the pendulum ascended through an arch 2.8 inches longer, by the additional motion of one penny-weight of matter, moving with the velocity of the swiftest part of the vapour; and consequently the velocity with which this penny-weight of matter moved, was that of about 7000 feet in a second.

"It will perhaps be objected to this determination, that the augmentation of the arch through which the pendulum vibrated in this case was not all of it owing to the quantity of motion given to the wad, but part of it was produced by the confinement of the powder, and the greater quantity thereby fired. But if it were true that a part only of the powder fired when there was no wad, it would not happen that in firing different quantities of powder without a wad the chord would increase and decrease nearly in the ratio of these quantities; which yet I have found it to do: for with nine pennyweights that chord was 7.3 inches, which with 12 pennyweights we have seen was only 10, and 10.1 inches; and even with three pennyweights the chord was two inches; deficient from this proportion by .5 only; for which defect too other valid reasons are to be assigned.

"And there is still a more convincing proof that all the powder is fired, although no wad be placed before the charge, which is, that the part of the recoil arising from the expansion of powder alone, is found to be no greater when it impels a leaden bullet before it, than when the same quantity is fired without any wad to confine it. We have seen that the chord of the arch through which the pendulum rose from the expansive force of the powder alone is 10, or 10.1; and the chord of that arch, when the piece was charged in the customary manner with a bullet and wad, I found to be the first time 22½, and the second 22¾, or at a medium 22.56. Now the impulse of the ball and wad, if they were supposed to strike the pendulum in the same place in which the barrel was suspended, with the velocity they had acquired at the mouth of the piece, would drive it through an arch whose chord would be about 12.3; as is known from the weight of the pendulum, the weight and position of the barrel, and the velocity of the bullet determined by our former experiments; whence, subtracting this number 12.3 from 22.56, the remainder 10.26 is nearly the chord of the arch which the pendulum would have ascended through from the expansion of the powder alone with a bullet laid before it. And this number, 10.26, differs but little from 10.1, which we have above found to be the chord of the ascending arch, when the same quantity of powder expanded itself freely without either bullet or wad before it.

"Again, that this velocity of 7000 feet in a second is not much beyond what the most active part of the flame acquires in expanding, is evinced from hence, that in some experiments a ball has been found to be discharged with a velocity of 2400 feet in a second; and yet it appeared not that the action of the powder was at all diminished on account of this immense celerity: consequently the degree of swiftness with which, in this instance, the powder followed the ball without losing any part of its pressure, must have been

much short of what the powder alone would have expanded with, had not the ball been there.

"From these determinations may be deduced the force of petards; since their action depends entirely on the impulse of the flame: and it appears that a quantity of powder properly disposed in such a machine, may produce as violent an effort as a bullet of twice its weight, moving with a velocity of 1400 or 1500 feet in a second.

"In many of the experiments already recited, the ball was not laid immediately contiguous to the powder, but at a small distance, amounting, at the utmost, only to an inch and a half. In these cases the theory agreed very well with the experiments. But if a bullet is placed at a greater distance from the powder, suppose at 12, 18, or 24 inches, we cannot then apply to this ball the same principles which may be applied to those laid in contact, or nearly so, with the powder; for when the surface of the fired powder is not confined by a heavy body, the flame dilates itself with a velocity far exceeding that which it can communicate to a bullet by its continued pressure: consequently, as at the distance of 12, 18, or 24 inches, the powder will have acquired a considerable degree of this velocity of expansion, the first motion of the ball will not be produced by the continued pressure of the powder, but by the actual percussion of the flame; and it will therefore begin to move with a quantity of motion proportioned to the quantity of this flame, and the velocities of its respective parts.

"From hence then it follows, that the velocity of the bullet, laid at a considerable distance before the charge, ought to be greater than what would be communicated to it by the pressure of the powder acting in the manner already mentioned: and this deduction from our theory we have confirmed by manifold experience; by which we have found, that a ball laid in the barrel A, with its hinder part 11½ inches from its breech, and impelled by twelve pennyweights of powder, has acquired a velocity of about 1400 feet in a second; when, if it had been acted on by the pressure of the flame only, it would not have acquired a velocity of 1200 feet in a second. The same we have found to hold true in all other greater distances, (and also in lesser, though not in the same degree), and in all quantities of powder: and we have likewise found, that these effects nearly correspond with what has been already laid down about the velocity of expansion and the elastic and inelastic parts of the flame.

"From hence too arises another consideration of great consequence in the practice of gunnery; which is, that no bullet should at any time be placed at a considerable distance before the charge, unless the piece is extremely well fortified: for a moderate charge of powder, when it has expanded itself through the vacant space, and reaches the ball, will, by the velocity each part has acquired, accumulate itself behind the ball, and thereby be condensed prodigiously; whence, if the barrel be not extremely firm in that part, it must, by means of this re-inforced elasticity, infallibly burst. The truth of this reasoning I have experienced in an exceeding good Tower-musket, forged of very tough iron; for, charging it with twelve pennyweights of powder, and placing the ball 16 inches from the breech, on firing it, the part of the barrel

22
A bullet
flies off
with the
greatest ve-
locity when
laid at a dis-
tance from
the powder.

just

THEORY.

THEORY.

just behind the bullet was swelled out to double its diameter like a blown bladder, and two large pieces of two inches long were burst out of it.

" Having seen that the entire motion of a bullet laid at a considerable distance from the charge, is acquired by two different methods in which the powder acts on it; the first being the percussion of the parts of the flame with the velocity they had respectively acquired by expanding, the second the continued pressure of the flame through the remaining part of the barrel; I endeavoured to separate these different actions, and to retain that only which arose from the continued pressure of the flame. For this purpose I no longer placed the powder at the breech, from whence it would have full scope for its expansion; but I scattered it as uniformly as I could through the whole cavity left behind the bullet; imagining that by this means the progressive velocity of the flame in each part would be prevented by the expansion of the neighbouring parts: and I found, that the ball being laid 11½ inches from the breech, its velocity, instead of 1400 feet in a second, which it acquired in the last experiments, was now no more than 1100 feet in the second, which is 100 feet short of what according to the theory should arise from the continued pressure of the powder only.

" The reason of this deficiency was, doubtless, the intestine motion of the flame: for the accension of the powder thus distributed through so much larger a space than it could fill, must have produced many reverberations and pulsations of the flame; and from these internal agitations of the fluid, its pressure on the containing surface will (as is the case of all other fluids) be considerably diminished; and in order to avoid this irregularity, in all other experiments I took care to have the powder closely confined in as small a space as possible, even when the bullet lay at some little distance from it.

" With regard to the resistance of the air, which so remarkably affects all military projectiles, it is necessary to premise, that the greatest part of authors have established it as a certain rule, that while the same body moves in the same medium, it is always resisted in the duplicate proportion of its velocity; that is, if the resisted body move in one part of its track with three times the velocity with which it moved in some other part, then its resistance to the greater velocity will be nine times the resistance to the lesser. If the velocity in one place be four times greater than in another, the resistance of the fluid will be 16 times greater in the first than in the second, &c. This rule, however, though pretty near the truth when the velocities are confined within certain limits, is excessively erroneous when applied to military projectiles, where such resistances often occur as could scarcely be effected, on the commonly received principles, even by a treble augmentation of its density.

" By means of the machine already described, I have it in my power to determine the velocity with which a ball moves in any part of its track, provided I can direct the piece in such a manner as to cause the bullet to impinge on the pendulum placed in that part: and therefore, charging a musket-barrel three times successively with a leaden ball ½ of an inch in diameter, and about half its weight of powder; and taking

such precaution in weighing of the powder and placing it, that I was assured, by many previous trials, that the velocity of the ball could not differ by 20 feet in a second from its medium quantity; I fired it against the pendulum placed at 25, 75, and 125 feet distance from the mouth of the piece respectively; and I found that it impinged against the pendulum, in the first case, with a velocity of 1670 feet in a second; in the second case, with a velocity of 1550 feet in a second; and in the third case, with a velocity of 1425 feet in a second: so that, in passing through 50 feet of air, the bullet lost a velocity of 120 or 125 feet in a second; and the time of its passing through that space being about ⅓ of a second, the medium quantity of resistance must, in these instances, have been about 120 times the weight of the ball; which (as the ball was nearly ⅓ of a pound) amounts to about 10 lb avoirdupoise.

" Now, if a computation be made according to the method laid down for compressed fluids in the 38th proposition of Newton's *Principia*, supposing the weight of water to that of air as 850 to 1, it will be found, that the resistance to a globe of ½ of an inch diameter, moving with a velocity of about 1600 feet in a second, will not, on these principles, amount to any more than 4½ lb avoirdupoise; whence, as we know that the rules contained in that proposition are very accurate with regard to slow motions, we may hence conclude, that the resistance of the air in slow motions is less than that in swift motions, in the ratio of 4½ to 10; a proportion between that of 1 to 2, and 1 to 3.

" Again, I charged the same piece a number of times with equal quantities of powder, and balls of the same weight, taking all possible care to give to every shot an equal velocity; and, firing three times against the pendulum placed only 25 feet from the mouth of the piece, the medium of the velocities with which the ball impinged was nearly that of 1690 feet in a second: then removing the piece 175 feet from the pendulum, I found, taking the medium of five shots, that the velocity with which the ball impinged at this distance, was 1300 feet in a second; whence the ball, in passing through 150 feet of air, lost a velocity of about 390 feet in a second; and the resistance computed from these numbers, comes out something more than in the preceding instance, it amounting here to between 11 and 12 pounds avoirdupoise; whence, according to these experiments, the resisting power of the air to swift motions is greater than to slow ones, in a ratio which approaches nearer to that of 3 to 1 than in the preceding experiments.

" Having thus examined the resistance to a velocity of 1700 feet in a second, I next examined the resistance to smaller velocities: and for this purpose, I charged the same barrel with balls of the same diameter, but with less powder, and placing the pendulum at 25 feet distance from the piece, I fired against it five times with an equal charge each time: the medium velocity with which the ball impinged, was that of 1180 feet in a second; then, removing the pendulum to the distance of 250 feet, the medium velocity of five shots, made at this distance, was that of 950 feet in a second: whence the ball, in passing through 225 feet of air, lost a velocity of 230 feet in a second:

and

23
Of the resistance of the air to the motion of bullets.

THEORY. and as it passed through that interval in about $\frac{1}{4}$ th of a second, the resistance to the middle velocity will come out to be near $33\frac{1}{2}$ times the gravity of the ball, or 2 lb. 10 oz. avoirdupoise. Now, the resistance to the same velocity, according to the laws observed in slower motions, amounts to $\frac{1}{17}$ of the same quantity; whence, in a velocity of 1065 feet in a second, the resisting power of the air is augmented in no greater a proportion than that of 7 to 11; whereas we have seen in the former experiments, that to still greater degrees of velocity the augmentation approached very near the ratio of one to three.

"But farther, I fired three shot, of the same size and weight with those already mentioned, over a large piece of water; so that their dropping into the water being very discernible, both the distance and time of their flight might be accurately ascertained. Each shot was discharged with a velocity of 400 feet in a second; and I had satisfied myself by many previous trials of the same charge with the pendulum, that I could rely on this velocity to ten feet in a second. The first shot flew 313 yards in four seconds and a quarter, the second flew 319 yards in four seconds, and the third 373 yards in five seconds and an half. According to the theory of resistance established for slow motions, the first shot ought to have spent no more than 3.2 seconds in its flight, the second 3.28, and the third 4 seconds; whence it is evident that every shot was retarded considerably more than it ought to have been had that theory taken place in its motion; consequently the resistance of the air is very sensibly increased, even in such a small velocity as that of 400 feet in a second.

"As no large shot are ever projected in practice with velocities exceeding that of 1700 feet in a second, it will be sufficient for the purposes of a practical gunner to determine the resistance to all lesser velocities, which may be thus exhibited. Let AB be taken to AC, in the ratio of 1700 feet in a second to the given velocity to which the resisting power of the air is required. Continue the line AB to D, so that BD may be to AD, as the resisting power of the air to slow motions is to its resisting power to a velocity of 1700 feet in a second; then shall CD be to AD, as the resisting power of the air to slow motions is to its resisting power to the given velocity represented by AC.

"From the computations and experiments already mentioned, it plainly appears, that a leaden ball of $\frac{1}{2}$ of an inch diameter, and weighing nearly 1½ oz. avoirdupoise, if it be fired from a barrel of 45 inches in length, with half its weight of powder, will issue from that piece with a velocity which, if it were uniformly continued, would carry it near 1700 feet in a second.—If, instead of a leaden ball, an iron one, of an equal diameter, was placed in the same situation in the same piece, and was impelled by an equal quantity of powder, the velocity of such an iron-bullet would be greater than that of the leaden one in the subduplicate ratio of the specific gravities of lead and iron; and supposing that ratio to be as three to two, and computing on the principles already laid down, it will appear, that an iron-bullet of 24 lb. weight, shot from a piece of ten feet in length, with 16 lb. of pow-

der, will acquire from the explosion a velocity which, if uniformly continued, would carry it nearly 1650 feet in a second.

"This is the velocity, which, according to our theory, a cannon-ball of 24 lb weight is discharged with when it is impelled by a full charge of powder; but if, instead of a quantity of powder weighing two thirds of the ball, we suppose the charge to be only half the weight of it, then its velocity will on the same principles be no more than 1490 feet in a second. The same would be the velocities of every lesser bullet fired with the same proportions of powder, if the lengths of all pieces were constantly in the same ratio with the diameters of their bore: and although, according to the usual dimensions of the smaller pieces of artillery, this proportion does not always hold, yet the difference is not great enough to occasion a very great variation from the velocities here assigned; as will be obvious to any one who shall make a computation thereon. But in these determinations we suppose the windage to be no more than is just sufficient for putting down the bullet easily; whereas in real service, either through negligence or unskilfulness, it often happens, that the diameter of the bore so much exceeds the diameter of the bullet, that great part of the inflamed fluid escapes by its side; whence the velocity of the shot in this case may be considerably less than what we have assigned. However, this perhaps may be compensated by the greater heat which in all probability attends the firing of these large quantities of powder.

"From this great velocity of cannon-shot we may clear up the difficulty concerning the point-blank shot, which occasioned the invention of Anderfon's strange hypothesis *. Here our author was deceived by his not knowing how greatly the primitive velocity of the heaviest shot is diminished in the course of its flight by the resistance of the air. And the received opinion of practical gunners is not more difficult to account for; since, when they agree that every shot flies in a straight line to a certain distance from the piece, which imaginary distance they have called the *extent of the point-blank shot*, we need only suppose, that, within that distance which they thus determine, the deviation of the path of the shot from a straight line is not very perceptible in their method of pointing. Now, as a shot of 24 lb. fired with two thirds of its weight of powder will, at the distance of 500 yards from the piece, be separated from the line of its original direction by an angle of little more than half a degree; those who are acquainted with the inaccurate methods often used in the directing of cannon will easily allow, that so small an aberration may not be attended to by the generality of practitioners, and the path of the shot may consequently be deemed a straight line; especially as other causes of error will often intervene much greater than what arises from the incurvation of this line by gravity.

"We have now determined the velocity of the shot, both when fired with two thirds of its weight and with half its weight of powder respectively; and on this occasion I must remark, that on the principles of our theory, the increasing the charge of powder will increase the velocity of the shot, till the powder arrives at its usual increment. By increasing the quantity of powder, the velocity of the shot will not continually increase.

THEORY.

THEORY.

Plate
CXIII.
fig. 6.

rives at a certain quantity; after which, if the powder be increased, the velocity of the shot will diminish. The quantity producing the greatest velocity and the proportion between that greatest velocity, and the velocity communicated by greater and lesser charges, may be thus ascertained. Let AB represent the axis of the piece; draw AC perpendicular to it, and to the asymptotes AC and AB draw any hyperbola LF, and draw BF parallel to AC; find out now the point D, where the rectangle ADEG is equal to the hyperbolic area DEFB; then will AD represent that height of the charge which communicates the greatest velocity to the shot: whence AD being to AB as 1 to 2.71828, as appears by the table of logarithms, from the length of the line AD thus determined, and the diameter of the bore, the quantity of powder contained in this charge is easily known. If, instead of this charge, any other filling the cylinder to the height AI be used, draw IH parallel to AC, and thro' the point H, to the same asymptotes AC and AB describe the hyperbola HK; then the greatest velocity will be to the velocity communicated by the charge AI, in the subduplicate proportion of the rectangle AE to the same rectangle diminished by the trilinear space KKE.

"It hath been already shewn, that the resistance of the air on the surface of a bullet of $\frac{1}{4}$ of an inch diameter moving with a velocity of 1670 feet in a second, amounted to about 10 lb. It hath also been shewn, that an iron bullet weighing 24 lb. if fired with 16 lb. of powder (which is usually esteemed its proper battering charge) acquires a velocity of about 1650 feet in a second, scarcely differing from the other: whence, as the surface of this last bullet is more than 54 times greater than the surface of a bullet of $\frac{1}{4}$ of an inch diameter, and their velocities are nearly the same, it follows, that the resistance on the larger bullet will amount to more than 540 lb. which is near 23 times its own weight.

"The two last propositions are principally aimed against those theorists who have generally agreed in supposing the flight of shot and shells to be nearly in the curve of a parabola. The reason given by those authors for their opinion is the supposed inconsiderable resistance of the air; since, as it is agreed on all sides that the track of projectiles would be a perfect parabola if there was no resistance, it has from thence been too rashly concluded, that the interruption which the ponderous bodies of shells and bullets would receive from such a rare medium as air would be scarcely sensible, and consequently that their parabolic flight would be hereby scarcely affected.

"Now the prodigious resistance of the air to a bullet of 24 lb. weight, such as we have here established it, sufficiently confutes this reasoning; for how erroneous must that hypothesis be, which neglects, as inconsiderable, a force amounting to more than 20 times the weight of the moving body?" But here it is necessary to assume a few particulars, the demonstrations of which, on the commonly received principles, may be seen under the article PROJECTILES.

"1. If the resistance of the air be so small, that the motion of a projected body is in the curve of a parabola; then the axis of that parabola will be perpendicular to the horizon; and consequently the part of the curve in which the body ascends will be equal and simi-

lar to that in which it descends.

"2. If the parabola in which the body moves, be terminated on a horizontal plane; then the vertex of the parabola will be equally distant from its two extremities.

"3. Also the moving body will fall on that horizontal plane in the same angle, and with the same velocity with which it was first projected.

"4. If a body be projected in different angles, but with the same velocity; then its greatest horizontal range will be when it is projected in an angle of 45° with the horizon.

"5. If the velocity with which the body is projected be known, then this greatest horizontal range may be thus found. Compute, according to the common theory of gravity, what space the projected body ought to fall through to acquire the velocity with which it is projected: then twice that space will be the greatest horizontal range, or the horizontal range when the body is projected in an angle of 45° with the horizon.

"6. The horizontal ranges of a body, when projected with the same velocity at different angles, will be between themselves as the sines of twice the angle in which the line of projection is inclined to the horizon.

"7. If a body is projected in the same angle with the horizon, but with different velocities; the horizontal ranges will be in the duplicate proportion of those velocities.

"These postulates which contain the principles of the modern art of gunnery, are all of them false: for it hath been already shewn, that a musket-ball $\frac{1}{4}$ of an inch in diameter, fired with half its weight of powder, from a piece 45 inches long, moves with a velocity of near 1700 feet in a second. Now, if this ball flew in the curve of a parabola, its horizontal range at 45° would be found by the fifth postulate to be about 17 miles. But all the practical writers assure us, that this range is really short of half a mile. Diego Ufano assigns to an arquebus, four feet in length, and carrying a leaden ball of 1½ oz. weight (which is very near our dimensions), an horizontal range of 797 common paces, when it is elevated between 40 and 50 degrees, and charged with a quantity of fine powder equal in weight to the ball. Merfennus also tells us, that he found the horizontal range of an arquebus at 45° to be less than 400 fathom, or 800 yards; whence, as either of these ranges are short of half an English mile, it follows, that a musket shot, when fired with a reasonable charge of powder at the elevation of 45°, flies not $\frac{1}{14}$ part of the distance it ought to do if it moved in a parabola. Nor is this great contraction of the horizontal range to be wondered at, when it is considered, that the resistance of this bullet, when it first issues from the piece, amounts to 120 times its gravity, as hath been experimentally demonstrated, n° 23.

"To prevent objections, our next instance shall be in an iron bullet of 24 lb weight, which is the heaviest in common use for land-service. Such a bullet fired from a piece of the common dimensions with its greatest allotment of powder hath a velocity of 1650 feet in second, as already shewn. Now, if the horizontal range of this shot, at 45°, be computed

28
Prodigious
errors of the common
theory.

on

26
Exceeding
great re-
sistance of
the air.

27
Common
maxims
concerning
the motion
of projec-
tiles.

THEORY.

THEORY.

on the parabolic hypothesis by the fifth postulate, it will come out to be about 16 miles, which is between five and six times its real quantity; for the practical writers all agree in making it less than three miles.

"But farther, it is not only when projectiles move with these very great velocities, that their slight sensibly varies from the curve of a parabola; the same aberration often takes place in such as move slow enough to have their motion traced out by the eye: for there are few projectiles that can be thus examined, which do not visibly disagree with the first, second, and third postulate; obviously descending thro' a curve, which is shorter and less inclined to the horizon than that in which they ascended. Also the highest point of their flight, or the vertex of the curve, is much nearer the place where they fall to the ground than to that from whence they were at first discharged.

"I have found too by experience; that the fifth, sixth, and seventh postulates are exceedingly erroneous, when applied to the motions of bullets moving with small velocities. A leaden bullet $\frac{1}{2}$ of an inch in diameter, discharged with a velocity of about 400 feet in a second, and in an angle of $19^{\circ} 5'$ with the horizon, ranged on the horizontal plane no more than 448 yards: whereas its greatest horizontal range, being found by the fifth postulate, to be at least 1700 yards, the range at $19^{\circ} 5'$ ought by the sixth postulate to have been 1050 yards; whence, in this experiment, the range was not $\frac{1}{3}$ of what it must have been, had the commonly received theory been true."

From this and other experiments it is clearly proved, that the track described by the flight even of the heaviest shot, is neither a parabola, nor approaching to a parabola, except when they are projected with very small velocities. The nature of the curve really described by them is explained under the article PROJECTILES. But as a specimen of the great complication of that subject, we shall here insert an account of a very extraordinary circumstance which frequently takes place therein.

"As gravity acts perpendicularly to the horizon, it is evident, that if no other power but gravity deflected a projected body from its course, its motion would be constantly performed in a plane perpendicular to the horizon, passing through the line of its original direction: but we have found, that the body in its motion often deviates from this plane; sometimes to the right hand, and at other times to the left; and this in an incurved line, which is convex towards that plane: so that the motion of a bullet is frequently in a line having a double curvature, it being bent towards the horizon by the force of gravity, and again bent out of its original direction to the right or left by some other force: in this case no part of the motion of the bullet is performed in the same plane, but its track will lie in the surface of a kind of cylinder, whose axis is perpendicular to the horizon.

"This proposition may be indisputably proved by the experience of every one in the least conversant with the practice of gunnery. The same piece which will carry its bullet within an inch of the intended mark at 10 yards distance, cannot be relied on to 10 inches in 100 yards, much less to 30 inches in

300 yards. Now this inequality can only arise from the tract of the bullet being incurved sideways as well as downwards: for by this means the distance between that incurved line and the line of direction will increase in a much greater ratio than that of the distance; these lines being coincident at the mouth of the piece, and afterwards separating in the manner of a curve and its tangent, if the mouth of the piece be considered as the point of contact.—To put this matter out of all doubt, however, I took a barrel carrying a ball $\frac{1}{2}$ of an inch diameter, and fixing it on a heavy carriage, I satisfied myself of the steadiness and truth of its direction, by firing at a board $1\frac{1}{2}$ feet square, which was placed at 180 feet distance; for I found, that in 16 successive shot I missed the mark but once. Now, the same barrel being fixed on the same carriage, and fired with a smaller quantity of powder, so that the shock on the discharge would be much less, and consequently the direction less changed, I found, that at 760 yards distance, the ball flew sometimes 100 yards to the right of the line it was pointed on, and sometimes as much to the left. I found too, that its direction in the perpendicular line was not less uncertain, it falling one time above 200 yards short of what it did at another; although, by the nicest examination of the piece after the discharge, it did not appear to have started in the least from the position it was placed in.

"The reality of this doubly curved tract being thus demonstrated, it may perhaps be asked, What can be the cause of a motion so different from what has been hitherto supposed? And to this I answer, that the deflection in question must be owing to some power acting obliquely to the progressive motion of the body; which power can be no other than the resistance of the air. If it be farther asked, How the resistance of the air can ever come to be oblique to the progressive motion of the body? I farther reply, that it may sometimes arise from inequalities in the resisted surface; but that its general cause is doubtless a whirling motion acquired by the bullet about its axis: for by this motion of rotation, combined with the progressive motion, each part of the bullet's surface will strike the air very differently from what it would do if there was no such whirl; and the obliquity of the action of the air arising from this cause, will be greater as the motion of the bullet is greater in proportion to its progressive one.

"This whirling motion undoubtedly arises from the friction of the bullet against the sides of the piece: and as the rotatory motion will in some part of its revolution conspire with the progressive one, and in another part be equally opposed to it; the resistance of the air on the fore part of the bullet will be hereby affected, and will be increased in that part where the whirling motion conspires with the progressive one, and diminished where it is opposed to it: and by this means, the whole effort of the resistance, instead of being opposite to the direction of the body, will become oblique thereto, and will produce those effects already mentioned. If it was possible to predict the position of the axis round which the bullet should whirl, and if that axis was unchangeable during the whole flight of the bullet, then the aberration of the bullet by this oblique force would be in

THEORY. a given direction; and the incurvation produced there-

by, would regularly extend the same way from one end of its track to the other. For instance, if the axis of the whirl was perpendicular to the horizon, then the incurvation would be to the right or left. If that axis was horizontal, and perpendicular to the direction of the bullet, then the incurvation would be upwards or downwards. But as the first position of this axis is uncertain, and as it may perpetually shift in the course of the bullet's flight; the deviation of the bullet is not necessarily either in one certain direction, or tending to the same side in one part of its track that it does in another, but more usually is continually changing the tendency of its deflection, as the axis round which it whirls must frequently shift its position to the progressive motion by many inevitable accidents.

"That a bullet generally acquires such a rotatory motion, as here described, is, I think, demonstrable; however, to leave no room for doubt or dispute, I confirmed it, as well as some other parts of my theory, by the following experiments.

30
Machine
for measur-
ing the air's
resistance.

"I canfied the machine to be made, represented, Plate CXLII. fig. 7. BCDE, is a brass-barrel, moveable on its axis, and so adjusted by means of friction-wheels, not represented in the figure, as to have no friction worth attending to. The frame in which this barrel is fixed is so placed, that its axis may be perpendicular to the horizon. The axis itself is continued above the upper plate of the frame, and has fastened on it a light hollow cone, AFG. From the lower part of this cone, there is extended a long arm of wood, GH, which is very thin, and cut feather-edged. At its extremity, there is a contrivance for fixing on the body, whose resistance is to be investigated, (as here the globe P); and to prevent the arm GH from swaying out of its horizontal position by the weight of the annexed body P, there is a brace, AH, of fine wire, fastened to the top of the cone which supports the end of the arm.

"Round the barrel BCDE, there is wound a fine silk line, the turns of which appear in the figure; and after this line hath taken a sufficient number of turns, it is conducted nearly in a horizontal direction to the pulley L over which it is passed, and then a proper weight M is hung to its extremity. If this weight be left at liberty, it is obvious that it will descend by its own gravity, and will, by its descent, turn round the barrel BCDE, together with the arm GH, and the body P fastened to it. And whilst the resistance on the arm GH and on the body P is less than the weight M, that weight will accelerate its motion; and thereby the motion of GH and P will increase, and consequently their resistance will increase, till at last this resistance and the weight M become nearly equal to each other. The motion with which M descends, and with which P revolves, will not then sensibly differ from an equable one. Whence, it is not difficult to conceive, that, by proper observations made with this machine, the resistance of the body P may be determined. The most natural method of proceeding in this investigation, is as follows: Let the machine first have acquired its equable motion, which it will usually do in about five or six turns from the beginning; and then let it be observed, by counting a number of

turns, what time is taken up by one revolution of the body P: then taking off the body P and the weight M, let it be examined what smaller weight will make the arm GH revolve in the same time as when P was fixed to it: this smaller weight being taken from M, the remainder is obviously equal in effort to the resistance of the revolving body P; and this remainder being reduced in the ratio of the length of the arm to the semidiameter of the barrel, will then become equal to the absolute quantity of the resistance. And as the time of one revolution is known, and consequently the velocity of the revolving body, there is hereby discovered the absolute quantity of the resistance to the given body P moving with a given degree of celerity.

"Here, to avoid all objections, I have generally chose, when the body P was removed, to fix in its stead a thin piece of lead of the same weight, placed horizontally; so that the weight which was to turn round the arm GH, without the body P, did also carry round this piece of lead. But mathematicians will easily allow that there was no necessity for this precaution.—The diameter of the barrel BCDE, and of the silk string wound round it, was 2.06 inches. The length of the arm GH, measured from the axis to the surface of the globe P, was 49.5 inches. The body P, the globe made use of, was of pasteboard; its surface very neatly coated with marbled-paper. It was not much distant from the size of a 12 lb. shot, being in diameter 4.5 inches, so that the radius of the circle described by the centre of the globe was 51.75 inches. When this globe was fixed at the end of the arm, and a weight of half a pound was hung at the end of the string at M, it was examined how soon the motion of the descending weight M, and of the revolving body P, would become equable as to sense. With this view, three revolutions being suffered to elapse, it was found that the next 10 were performed in $27\frac{1}{4}$, 20 in less than $55''$, and 30 in $82\frac{1}{4}$; so that the first ten were performed in $27\frac{1}{4}$, the second in $27\frac{1}{4}$, and the third in $27\frac{1}{4}$.

"These experiments sufficiently evince, that even with half a pound, the smallest weight made use of, the motion of the machine was sufficiently equable after the first three revolutions.

"The globe above-mentioned being now fixed at the end of the arm, there was hung on at M a weight of $3\frac{1}{2}$ lb; and ten revolutions being suffered to elapse, the succeeding 20 were performed in $21\frac{1}{4}$. Then the globe being taken off, and a thin plate of lead, equal to it in weight, placed in its room; it was found, that instead of $3\frac{1}{2}$ lb. a weight of one pound would make it revolve in less time than it did before; performing now 20 revolutions after 10 were elapsed, in the space of 19".

"Hence then it follows, that from the $3\frac{1}{2}$ lb. first hung on, there is less than 1 lb. to be deducted for the resistance on the arm; and consequently the resistance of the globe itself is not less than the effort of $2\frac{1}{2}$ lb. in the situation M; and it appearing from the former measures, that the radius of the barrel is nearly $\frac{1}{10}$ of the radius of the circle, described by the centre of the globe; it follows, that the absolute resistance of the globe, when it revolves 20 times in $21\frac{1}{4}$, (about 25 feet in a second), is not less than the fiftieth part of two pounds and a quarter, or of 36 ounces;

THEORY. and this being considerably more than half an ounce, and the globe nearly the size of a twelve-pound shot, it irrefragably confirms a proposition I had formerly laid down from theory, that the resistance of the air to a twelve-pound iron shot, moving with a velocity of 25 feet in a second, is not less than half an ounce.

"The rest of the experiments were made, in order to confirm another proposition, namely, that the resistance of the air within certain limits is nearly in the duplicate proportion of the velocity of the resisted body. To investigate this point, there were successively hung on at M, weights in the proportion of the numbers 1, 4, 9, 16; and letting 10 revolutions first elapse, the following observations were made on the rest.—With $\frac{1}{2}$ lb. the globe went 20 turns in $54\frac{1}{2}$ s; with 2 lb. it went 20 turns in $27\frac{1}{2}$ s, with $4\frac{1}{2}$ lb. it went 30 turns in $27\frac{1}{2}$ s, and with 8 lb. it went 40 turns in $27\frac{1}{2}$ s.—Hence it appears, that to resistances proportioned to the numbers 1, 4, 9, 16, there correspond velocities of the resisted body in the proportion of the numbers 1, 2, 3, 4: which proves, with great nicety, the proposition above-mentioned.

"With regard to the rotatory motion, the first experiment was to evince, that the whirling motion of a ball combining with its progressive motion, would produce such an oblique resistance and deflective power as already mentioned. For this purpose a wooden ball of $4\frac{1}{2}$ inches diameter was suspended by a double string, about eight or nine feet long. Now, by turning round the ball and twisting the double string, the ball when left to itself would have a revolving motion given it from the untwisting of the string again. And if, when the string was twisted, the ball was drawn to a considerable distance from the perpendicular, and there let go; it would at first, before it had acquired its revolving motion, vibrate steadily enough in the same vertical plane in which it first began to move: but when, by the untwisting of the string, it had acquired a sufficient degree of its whirling motion, it constantly deflected to the right or left of its first track; and sometimes proceeded so far as to have its direction at right angles to that in which it began its motion; and this deviation was not produced by the string itself, but appeared to be entirely owing to the resistance being greater on the one part of the leading surface of the globe, than the other. For the deviation continued when the string was totally untwisted; and even during the time that the string, by the motion the globe had received, was twisting the contrary way. And it was always easy to predict before the ball was let go, which way it would deflect, only by considering on which side the whirl would be combined with the progressive motion; for on that side always the deflective power acted, as the resistance was greater here than on the side where the whirl and progressive motion were opposed to one another."

Though Mr Robins considered this experiment as an incontestable proof of the truth of his theory, he undertook to give ocular demonstration of this deflection of musket-bullets even in the short space of 100 yards.

"As all projectiles," says he, "in their flight, are acted upon by the power of gravity, the deflection of a bullet from its primary direction, supposes that deflection to be upwards or downwards in a vertical

plane; because, in the vertical plane, the action of gravity is compounded and entangled with the deflective force. And for this reason my experiments have been principally directed to the examination of that deflection which carries the bullet to the right or left of that plane in which it began to move. For if it appears at any time that the bullet has shifted from that vertical plane in which the motion began, this will be an incontestable proof of what we have advanced.—Now, by means of screens of exceeding thin paper, placed parallel to each other at proper distances, this deflexion in question may be many ways investigated. For by firing bullets which shall traverse these screens, the flight of the bullet may be traced; and it may easily appear whether they do or do not keep invariably to one vertical plane. This examination may proceed on three different principles, which I shall here separately explain.

"For first, an exactly vertical plane may be traced out upon all these screens, by which the deviation of any single bullet may be more readily investigated, only by measuring the horizontal distance of its trace from the vertical plane thus delineated; and by this means the absolute quantity of its aberration may be known. Or if the description of such a vertical plane should be esteemed a matter of difficulty and nicety, a second method may be followed; which is that of resting the piece in some fixed notch or socket, so that though the piece may have some little play to the right and left, yet all the lines in which the bullet can be directed shall intersect each other in the centre of that fixed socket: by this means, if two different shots are fired from the piece thus situated, the horizontal distances made by the two bullets on any two screens ought to be in the same proportion to each other as the respective distances of the screens from the socket in which the piece was laid. And if these horizontal distances differ from that proportion, then it is certain that one of the shot at least hath deviated from a vertical plane, although the absolute quantity of that deviation cannot hence be assigned; because it cannot be known what part of it is to be imputed to one bullet, and what to the other.

"But if the constant and invariable position of the notch or socket in which the piece was placed, be thought too hard an hypothesis in this very nice affair; the third method, and which is the simplest of all, requires no more than that two shot be fired through three screens without any regard to the position of the piece each time: for in this case, if the shots diverge from each other, and both keep to a vertical plane, then if the horizontal distances of their traces on the first screen be taken from the like horizontal distances on the second and third, the two remainders will be in the same proportion with the distances of the second and third screen from the first. And if they are not in this proportion, then it will be certain that one of them at least hath been deflected from the vertical plane; though here, as in the last case, the quantity of that deflexion in each will not be known.

"All these three methods I have myself made use of at different times, and have ever found the success of them agreeable to my expectation. But the most eligible method seemed to be a compound of the two last. The apparatus was as follows.—Two screens were set

Remarks.
of bullets to the right and left.
set

set up in the large walk in the charter-house garden; the first of them at 250 feet distance from the wall, which was to serve for a third screen; and the second 200 feet from the same wall. At 50 feet before the first screen, or at 300 feet from the wall, there was placed a large block weighing about 200 lb. weight, and having fixed into it an iron bar with a socket at its extremity, in which the piece was to be laid. The piece itself was of a common length, and bored for an ounce ball. It was each time loaded with a ball of 17 to the pound; so that the windage was extremely small, and with a quarter of an ounce of good powder. The screens were made of the thinnest isfine paper; and the resistance they gave to the bullet, (and consequently their probability of deflecting it) was so final, that a bullet lighting one time near the extremity of one of the screens, left a fine thin fragment of it towards the edge entire, which was so very weak that it was difficult to handle it without breaking. These things thus prepared, five shot were made with the piece rested in the notch above-mentioned; and the horizontal distances between the first shot, which was taken as a standard, and the four succeeding ones, both on the first and second screen and on the wall, measured in inches, were as follows:

	1st Screen.	2d Screen.	Wall.
1 to 2	1,75 R.	3,15 R.	16,7 R.
3	10 L.	15,6 L.	69,25 L.
4	1,25 L.	4,5 L.	15,0 L.
5	2,15 L.	5,1 L.	19,0 L.

“ Here the letters R and L denote that the shot in question went either to the right or left of the first.

“ If the position of the socket in which the piece was placed be supposed fixed, then the horizontal distances measured above on the first and second screen, and on the wall, ought to be in proportion to the distances of the first screen, the second screen, and the wall from the socket. But by only looking over these numbers, it appears, that none of them are in that proportion; the horizontal distance of the first and third, for instance, on the wall being above nine inches more than it should be by this analogy.

“ If, without supposing the invariable position of the socket, we examine the comparative horizontal distances according to the third method described above, we shall in this case discover variations still more extraordinary; for, by the numbers set down, it appears, that the horizontal distances of the second and third shot on the two screens, and on the wall, are as under.

1st Screen.	2d Screen.	Wall.
11.75	18.75	83.95

Here, if, according to the rule given above, the distance on the first screen be taken from the distances on the other two, the remainder will be 7, and 74.2: and these numbers, if each shot kept to a vertical plane, ought to be in the proportion of 1 to 5; that being the proportion of the distances of the second screen and of the wall from the first: but the last number 74.2 exceeds what it ought to be by this analogy by 39.2; so that between them there is a deviation from the vertical plane of above 39 inches, and this too in a transit of little more than 80 yards.

“ But farther, to shew that these irregularities do not depend on any accidental circumstance of the balls

firing or not firing the piece, there were five shots more made with the same quantity of powder as before; but with smaller bullets, which ran much looser in the piece. And the horizontal distances being measured in inches from the trace of the first bullet to each of the succeeding ones, the numbers were as under.

	1st Screen.	2d Screen.	Wall.
1 to 2	15.6 R.	31.1 R.	94.0 R.
3	6.4 L.	12.75 L.	23.0 L.
4	4.7 R.	8.5 R.	15.5 R.
5	12.6 R.	24.0 R.	63.5 R.

Here, again, on the supposed fixed position of the piece, the horizontal distance on the wall between the first and third will be found above 15 inches less than it should be if each kept to a vertical plane; and like irregularities, though smaller, occur in every other experiment. And if they are examined according to the third method set down above, and the horizontal distances of the third and fourth, for instance, are compared, those on the first and second screen, and on the wall, appear to be thus.

1st Screen.	2d Screen.	Wall.
11.1.	21.25.	38.5.

And if the horizontal distance on the first screen be taken from the other two, the remainders will be 10.15, and 27.4; where the least of them, instead of being five times the first, as it ought to be, is 23.35 short of it; so that here is a deviation of 23 inches.

“ From all these experiments, the deflection in question seems to be incontestably evinced. But to give some farther light to this subject, I took a barrel of the same bore with that hitherto used; and bent it at about three or four inches from its muzzle to the left, the bend making an angle of three or four degrees with the axis of the piece. This piece thus bent was fired with a loose ball, and the same quantity of powder hitherto used, the screens of the last experiment being still continued. It was natural to expect, that if this piece was pointed by the general direction of its axis, the ball would be canted to the left of that direction by the bend near its mouth. But as the bullet, in passing through that bent part, would, as I conceived, be forced to roll upon the right-hand side of the barrel, and thereby its left side would turn up against the air, and would increase the resistance on that side; I predicted to the company then present, that if the axis, on which the bullet whirled, did not shift its position after it was separated from the piece; then, notwithstanding the bend of the piece to the left, the bullet itself might be expected to incurve towards the right; and this, upon trial, did most remarkably happen. For, one of the bullets fired from this bent piece, passed through the first screen about 1½ inch distant from the trace of one of the shot fired from the straight piece in the last set of experiments. On the second screen, the traces of the same bullets were about three inches distant; the bullet from the crooked piece passing on both screens to the left of the other: but, comparing the places of these bullets on the wall, it appeared, that the bullet from the crooked piece, though it diverged from the track on the two screens, had now crossed that track, and was deflected considerably to the right of it; so that it was obvious, that though the bullet from the crooked piece might first be canted to the left, and had diverged from the track of the

THEORY.

THEORY.

other bullet with which it was compared, yet by degrees it deviated again to the right, and a little beyond the second screen crossed that track from which it before diverged, and on the wall was deflected 14 inches, as I remember, on the contrary side. And this experiment is not only the most convincing proof of the reality of this deflection here contended for; but is likewise the strongest confirmation that it is brought about in the very manner and by the very circumstances which we have all along described.

"I have only now to add, that as I suspected the consideration of the revolving motion of the bullet, compounded with its progressive one, might be considered as a subject of mathematical speculation, and that the reality of any deflecting force thence arising might perhaps be denied by some computists upon the principles hitherto received of the action of fluids; I thought proper to annex a few experiments, with a view of evincing the strange deficiency of all theories of this sort hitherto established, and the unexpected and wonderful varieties which occur in these matters: The proposition which I advanced for this purpose being, That two equal surfaces meeting the air with the same degree of obliquity, may be so differently resisted, that though in one of them the resistance is less than that of a perpendicular surface meeting the same quantity of air, yet in another it shall be considerably greater.

33
Strange
anomaly in
the resistance
of the
air.

"To make out this proposition, I made use of the machine already described; and having prepared a pasteboard pyramid, whose base was four inches square, and whose planes made angles of 45° with the plane of its base; and also a parallelogram four inches in breadth, and $5\frac{1}{2}$ in length, which was equal to the surface of the pyramid, the globe P was taken off from the machine, and the pyramid was first fixed on; and 2 lb. being hung at M, and the pyramid so fitted as to move with its vertex forwards, it performed 20 revolutions after the first ten were elapsed, in $33''$. Then the pyramid being turned, so that its base, which was a plane of four inches square, went foremost, it now performed 20 revolutions with the same weight in $38''\frac{1}{2}$.—After this, taking off the pyramid, and fixing on the parallelogram with its longer side perpendicular to the arm, and placing its surface in an angle of 45° with the horizon by a quadrant, the parallelogram, with the same weight, performed 20 revolutions in $43''\frac{1}{2}$.

"Now here this parallelogram and the surface of the pyramid are equal to each other, and each of them met the air in an angle of 45° ; and yet one of them made 20 revolutions in $33''$, whilst the other took up $43\frac{1}{2}$. And at the same time it appears, that a flat surface, such as the base of a pyramid, which meets the same quantity of air perpendicularly, makes 20 revolutions in $38''\frac{1}{2}$, which is the medium between the other two.

"But to give another, and still more simple, proof of this principle; there was taken a parallelogram four inches broad, and $8\frac{1}{4}$ long. This being fixed at the end of the arm, with its long side perpendicular thereto, and being placed in an angle of 45° with the horizon, there was a weight hung on at M of $3\frac{1}{2}$ lb. with which the parallelogram made 20 revolutions in $40''\frac{1}{2}$. But after this, the position of the parallelogram was

shifted, and it was placed with its shorter side perpendicular to the arm, though its surface was still inclined to an angle of 45° with the horizon; and now, instead of going slower, as might be expected from the greater extent of part of its surface from the axis of the machine, it went round much faster: for in this last situation it made 20 revolutions in $35''\frac{1}{2}$, so that there were $5''$ difference in the time of 20 revolutions; and this from no other change of circumstance than as the larger or shorter side of the oblique plane was perpendicular to the line of its direction."

These are the principal experiments made by Mr Robins, in confirmation of his theory, and which not only far exceed every thing that had been formerly done, but even bid fair for advancing the art of gunnery to its *ne plus ultra*. It must be observed, however, that in this art it is impossible we should ever arrive at absolute perfection; that is, it can never be expected that a gunner, by any method of calculation whatever, could be enabled to point his guns in such a manner, that the shot would hit the mark if placed any where within its range. Aberrations which can by no means be either foreseen or prevented, will take place from a great number of different causes. A variation in the density of the atmosphere, in the dampness of the powder, or in the figure of the shot, will cause variations in the range of the bullet, which cannot by any means be reduced to rules, and consequently must render the event of each shot very precarious. The resistance of the atmosphere simply considered, without any of those anomalies arising from its density at different times, is a problem, which, notwithstanding the labours of Mr Robins and others, hath not been completely solved; and indeed, if we consider the matter in a physical light, we shall find, that without some other data than those which are yet obtained, an exact solution of it is impossible.

It is an objection that hath been made to the mathematical philosophy, and to which in many cases it is most certainly liable, that it considers the *resistance* of matter more than its capacity of giving motion to other matter. Hence, if in any case matter acts both as a resisting and a moving power, and the mathematician overlooks its effort towards motion, founding his demonstrations only upon its property of resisting, these demonstrations will certainly be false, tho' they should be supported by all the powers of geometry. It is to an error of this kind that we are to attribute the great differences already taken notice of between the calculations of Sir Isaac Newton, with regard to the resisting force of fluids, and what actually takes place upon trial. These calculations were made upon the supposition that the fluid through which a body moved could do nothing else but resist it; yet it is certain, that the air (the fluid with which we have to do at present) proves a source of *motion*, as well as resistance, to all bodies which move in it.

To understand this matter fully, let ABC represent a crooked tube made of any solid matter, and *a, b*, two pistons which exactly fill the cavity. If the space between these pistons is full of air, it is plain they cannot come into contact with each other on account of the elasticity of the included air, but will remain at some certain distance as represented in the figure. If the piston *b* is drawn up, the air which presses in the direction

33
Why the
art of gun-
nery cannot
become
perfect.

34
The air acts
as a moving
power
as well as a
resisting
one.

Plate
CXLII.
fig. 8.

tion

THEORY. tion *Cb* acts as a resisting power, and the piston will not be drawn up with such ease as if the whole was in *vacuo*. But though the column of air pressing in the direction *Cb* acts as a resisting power on the piston *b*, the column pressing in the direction *Aa* will act as a moving power upon the piston *a*. It is therefore plain, that if *b* is moved upwards till it comes to the place marked *d*, the other will descend to that marked *c*. Now if we suppose the piston *a* to be removed, it is plain, that when *b* is pulled upwards to *d*, the air descending through the leg *AaCB* will press on the under side of the piston *b*, as strongly as it would have done upon the upper side of the piston *a*, had it been present. Therefore, though the air pressing down thro' the leg *CB* resists the motion of the piston *b* when drawn upwards, the air pressing down through the leg *AB* forwards it as much; and accordingly the piston *b* may be drawn up or pushed down at pleasure, and with very little trouble. But if the orifice at *A* is stopped, so that the air can only exert its resisting power on the piston *b*, it will require a considerable degree of strength to move the piston from *b* to *d*.

If now we suppose the tube to be entirely removed (which indeed answers no other purpose than to render the action of the air more evident), it is plain, that if the piston is moved either up or down, or in any other direction we can imagine, the air presses as much upon the back part of it, as it resists it on the fore part; and of consequence, a ball moving through the air with any degree of velocity, ought to be as much accelerated by the action of the air behind, as it is retarded by the action of that before.—Here then it is natural to ask, If the air accelerates a moving body as much as it retards it, how comes it to make any resistance at all? yet certain it is, that this fluid doth resist, and that very considerably. To this it may be answered, that the air is always kept in some certain state or constitution by another power which rules all its motions, and it is this power undoubtedly which gives the resistance. It is not to our purpose at present to inquire what that power is; but we see that the air is often in very different states: one day, for instance, its parts are violently agitated by a storm; and another, perhaps, they are comparatively at rest in a calm. In the first case, nobody hesitates to own, that the storm is occasioned by some cause or other, which violently resists any other power that would prevent the agitation of the air. In a calm, the case is the same; for it would require the same exertion of power to excite a tempest in a calm day, as to allay a tempest in a stormy one. Now it is evident, that all projectiles, by their motion, agitate the atmosphere in an unnatural manner; and consequently are resisted by that power, whatever it is, which tends to restore the equilibrium, or bring back the atmosphere to its former state.

If no other power besides that above-mentioned acted upon projectiles, it is probable, that all resistance to their motion would be in the duplicate proportion of their velocities; and accordingly, as long as the velocity is small, we find it generally is so. But when the velocity comes to be exceedingly great, other sources of resistance arise. One of these, is a subtraction of part of the moving power; which though not properly a *resistance*, or opposing another power to it, is an equivalent thereto. This subtraction arises from

the following cause. The air, as we have already observed, presses upon the hinder part of the moving body by its gravity, as much as it resists the forepart of it by the same property. Nevertheless, the velocity with which the air presses upon any body by means of its gravity, is limited; and it is possible that a body may change its place with so great velocity that the air hath not time to rush in upon the back part of it, in order to assist its progressive motion. When this happens to be the case, there is in the first place a deficiency of the moving power equivalent to 15 pounds on every square inch of surface; at the same time that there is a positive resistance of as much more on the forepart, owing to the gravity of the atmosphere, which must be overcome before the body can move forward.

This deficiency of moving power, and increase of resistance, do not only take place when the body moves with a very great degree of velocity, but in all motions whatever. It is not in all cases perceptible, because the velocity with which the body moves, frequently bears but a very small proportion to the velocity with which the air presses in behind it. Thus, supposing the velocity with which the air rushes into a vacuum to be 1200 feet in a second, if a body moves with a velocity of 30, 40, or 50 feet in a second, the force with which the air presses on the back part is but $\frac{1}{4}$, at the utmost less than that which resists on the forepart of it, which will not be perceptible: but if, as in the case of bullets, the velocity of the projectile comes to have a considerable proportion to the velocity wherewith the air rushes in behind it; then a very perceptible, and otherwise unaccountable resistance is observed, as we seen in the experiments already related by Mr Robins. Thus, if the air presses in with a velocity of 1200 feet in a second, if the body changes its place with a velocity of 600 feet in the same time, there is a resistance of 15 pounds on the fore part, and a pressure of only $7\frac{1}{2}$ on the back part. The resistance therefore not only overcomes the moving power of the air by $7\frac{1}{2}$ pounds, but there is a deficiency of other $7\frac{1}{2}$ pounds owing to the want of half the pressure of the atmosphere on the back part, and thus the whole loss of the moving power is equivalent to 15 pounds; and hence the exceeding great increase of resistance observed by Mr Robins beyond what it ought to be according to the common computations.—The velocity with which the air rushes into a vacuum is therefore a desideratum in gunnery. Mr Robin's supposes that it is the same with the velocity of sound; and that when a bullet moves with a velocity greater than that of 1200 feet in a second, it leaves a perfect vacuum behind it. Hence he accounts for the great increase of resistance to bullets moving with such velocities; but as he doth not take notice of the loss of the air's moving power, the anomalies of all lesser velocities are inexplicable on his principles. Nay, he even tell us, that Sir Isaac Newton's rule for computing resistances may be applied in all velocities less than 1100 or 1200 feet in a second, though this is expressly contradicted by his own experiments mentioned n^o 23.

Though for these reasons it is evident how great difficulties must occur in attempting to calculate the resistance of the air to military projectiles, we have not even yet discovered all the sources of resistance to these bodies when moving with immense velocities. Another

35.
It resists by its elasticity as well as gravity.

scribed; and perhaps somewhat of this kind, says Mr Robins, tho' not in the manner now practised, would be of all others the most perfect method for the construction of these kinds of barrels.

From the whirling motion communicated by the rifles, it happens, that when the piece is fired, that indented zone of the bullet follows the sweep of the rifles; and thereby, besides its progressive motion, acquires a circular motion round the axis of the piece; which circular motion will be continued to the bullet after its separation from the piece; and thus a bullet discharged from a rifled barrel is constantly made to whirl round an axis which is coincident with the line of its flight. By this whirling on its axis, the aberration of the bullet which proves so prejudicial to all operations in gunnery, is almost totally prevented. The reason of this may be easily understood from considering the slow motion of an arrow through the air. For example, if a bent arrow, with its wings not placed in some degree in a spiral position, so as to make it revolve round its axis as it flies through the air, were shot at a mark with a true direction, it would constantly deviate from it, in consequence of being pressed to one side by the convex part opposing the air obliquely. Let us now suppose this deflection in a flight of 100 yards to be equal to 10 yards. Now, if the same bent arrow were made to revolve round its axis once every two yards of its flight, its greatest deviation would take place when it had proceeded only one yard, or made half a revolution; since at the end of the next half revolution it would again return to the same direction it had at first; the convex side of the arrow having been once in opposite positions. In this manner it would proceed during the whole course of its flight, constantly returning to the true path at the end of every two yards; and when it reached the mark, the greatest deflection to either side that could happen would be equal to what it makes in proceeding one yard, equal to $\frac{1}{10}$ th part of the former, or 3.6 inches, a very small deflection when compared with the former one. In the same manner, a cannon-ball which turns not round its axis, deviates greatly from the true path, on account of the inequalities on its surface; which, although small, cause great deviations by reason of the resistance of the air, at the same time that the ball acquires a motion round its axis in some uncertain direction occasioned by the friction against its sides. But by the motion acquired from the rifles, the error is perpetually corrected in the manner just now described; and accordingly such pieces are much more to be depended on, and will do execution at a much greater distance, than the others.

The reasons commonly alleged for the superiority of rifle-barrels over common ones, are, either that the inflammation of the powder is greater, by the resistance which the bullet makes by being thus forced into the barrel, and that hereby it receives a much greater impulse; or that the bullet by the compounding of its circular and revolving motions, did as it were bore the air, and thereby flew to a much greater distance than it would otherwise have done; or that by the same boring motion it made its way through all solid substances, and penetrated into them much deeper than when fired in the common manner. But Mr Robins hath proved these reasons to be altogether

erroneous, by a great number of experiments made with rifle-barrelled pieces. "In these experiments," says he, "I have found that the velocity of the bullet fired from a rifled barrel was usually less than that of the bullet fired from a common piece with the same proportion of powder. Indeed it is but reasonable to expect that this should be the case; for if the rifles are very deep, and the bullet is large enough to fill them up, the friction bears a very considerable proportion to the effort of the powder. And that in this case the friction is of consequence enough to have its effects observed, I have discovered by the continued use of the same barrel. For the metal of the barrel being soft, and wearing away apace, its bore by half a year's use was considerably enlarged, and consequently the depth of its rifles diminished; and then I found that the same quantity of powder would give to the bullet a velocity near a tenth part greater than what it had done at first. And as the velocity of the bullet is not increased by the use of rifled barrels, so neither is the distance to which it flies, nor the depth of its penetration into solid substances. Indeed these two last suppositions seem at first sight too chimerical to deserve a formal confutation. But I cannot help observing that those who have been habituated to the use of rifled pieces are very excusable in giving way to these prepossessions. For they constantly found, that with them they could fire at a mark with tolerable success, though it were placed at three or four times the distance to which the ordinary pieces were supposed to reach. And therefore, as they were ignorant of the true cause of this variety, and did not know that it arose only from preventing the deflection of the ball; it was not unnatural for them to imagine that the superiority of effect in the rifled piece was owing either to a more violent impulse at first, or to a more easy passage through the air.

"In order to confirm the foregoing theory of rifle-barrelled pieces, I made some experiments by which it might be seen whether one side of the ball discharged from them uniformly keeps foremost during the whole course. To examine this particular, I took a rifled barrel carrying a bullet of six to the pound; but instead of its leaden bullet I used a wooden one of the same size, made of a soft springy wood, which bent itself easily into the rifles without breaking. And firing the piece thus loaded against a wall at such a distance as the bullet might not be shivered by the blow, I always found, that the same surface which lay foremost in the piece continued foremost without any sensible deflection during the time of its flight. And this was easily to be observed, by examining the bullet; as both the marks of the rifles, and the part that impinged on the wall, were sufficiently apparent. Now, as these wooden bullets were but the 16th part of the weight of the leaden ones; I conclude, that if there had been any unequal resistance or defective power, its effects must have been extremely sensible upon this light body, and consequently in some of the trials I made the surface which came foremost from the piece must have been turned round into another situation.

"But again, I took the same piece, and, loading it now with a leaden ball, I set it nearly upright, sloping it only three or four degrees from the perpendicular in the direction of the wind; and firing it in this situation, the bullet

PRACTICE

PRACTICE

bullet generally continued about half a minute in the air, it rising by computation to near three quarters of a mile perpendicular height. In these trials I found that the bullet commonly came to the ground to the leeward of the piece, and at such a distance from it, as nearly corresponded to the angle of its inclination, and to the effort of the wind; it usually falling not nearer to the piece than 100, nor farther from it than 150, yards. And this is a strong confirmation of the almost steady flight of this bullet, for about a mile and a half: for were the same trial made with a common piece, I doubt not but the deviation would often amount to half a mile, or perhaps considerably more; though this experiment would be a very difficult one to examine, on account of the little chance there would be of discovering where the ball fell.

37
Balls from
rifled pieces
will at
length de-
viate from
their true
course.

“It must be observed, however, that though the bullet impelled from a rifle-barrelled piece keeps for a time to its regular track with sufficient nicety; yet if its flight be so far extended that the track becomes considerably incurvated, it will then undergo considerable deflections. This, according to my experiments, arises from the angle at last made by the axis on which the bullet turns, and the direction in which it flies: for that axis continuing nearly parallel to itself, it must necessarily diverge from the line of the flight of the bullet, when that line is bent from its original direction; and when it once happens that the bullet whirls on an axis which no longer coincides with the line of its flight, then the unequal resistance formerly described will take place, and the deflecting power hence arising will perpetually increase as the track of the bullet by having its range extended becomes more and more incurvated.—This matter I have experienced in a small rifle-barrelled piece, carrying a leaden ball of near half an ounce weight. For this piece, charged with one drachm of powder, ranged about 550 yards at an angle of 12 degrees with sufficient regularity; but being afterwards elevated to an angle of 24 degrees, it then ranged very irregularly, generally deviating from the line of its direction to the left, and in one case not less than 100 yards. This apparently arose from the cause above-mentioned, as was confirmed from the constant deviation of the bullet to the left; for by considering how the revolving motion was continued with the progressive one, it appeared that a deviation that way was to be expected.

“The best remedy I can think of for this defect, is the making use of bullets of an egg-like form instead of spherical ones. For if such a bullet hath its shorter axis made to fit the piece, and it be placed in the barrel with its smaller end downwards; then it will acquire by the rifles a rotation round its larger axis; and its centre of gravity lying nearer to its fore than its hinder part, its longer axis will be constantly forced by the resistance of the air into the line of its flight; as we see, that by the same means arrows constantly lie in the line of their direction, however that line be incurvated.

“But, besides this, there is another circumstance in the use of these pieces, which renders the flight of their bullets uncertain when fired at a considerable elevation. For I find by my experiments, that the velocity of a bullet fired with the same quantity of powder from a rifled barrel, varies much more from

itself in different trials, than when fired from a common piece.—This, as I conceive, is owing to the great quantity of friction, and the impossibility of rendering it equal in each experiment. Indeed, if the rifles are not deeply cut, and if the bullet is nicely fitted to the piece, so as not to require a great force to drive it down, and if leather or fustian well greased is made use of between the bullet and barrel, perhaps, by a careful attention to all these particulars, great part of the inequality in the velocity of the bullet may be prevented, and the difficulty in question be in some measure obviated: but, till this be done, it cannot be doubted, that the range of the same piece, at an elevation, will vary considerably in every trial; although the charge be each time the same. And this I have myself experienced, in a number of diversified trials, with a rifle-barrelled piece loaded at the breech in the English manner. For here the rifles being indented very deep, and the bullet so large as to fill them up completely; I found, that though it flew with sufficient exactness to the distance of four or five hundred yards; yet, when it was raised to an angle of about 12 degrees, (at which angle, being fired with one-fifth of its weight in powder, its medium range is nearly 1000 yards); in this case, I say, I found that its range was variable, although the greatest care was taken to prevent any inequalities in the quantity of powder, or in the manner of charging. And as, in this case, the angle was too small for the first-mentioned irregularity to produce the observed effects; they can only be imputed to the different velocities which the bullet each time received by the unequal action of the friction.”

Thus we see, that it is in a manner impossible entirely to correct the aberrations arising from the resistance of the atmosphere; as even the rifle-barrelled pieces cannot be depended upon for more than one half of their actual range at any considerable elevation. It becomes therefore a problem very difficult of solution, to know, even within a very considerable distance, how far a piece will carry its ball with any probability of hitting its mark, or doing any execution. The best rules hitherto laid down on this subject, are those of Mr Robins. The foundation of all his calculations, is the velocity with which the bullet flies off from the mouth of the piece. Mr Robins himself had not opportunities of making many experiments on the velocities of cannon-balls, and the calculations from smaller ones cannot always be depended upon. In the 68th volume of the Phil. Transf. Mr Hutton hath recited a number of experiments made on cannon carrying balls of 38
from one to three pounds weight. His machine for experiments on discovering the velocities of these balls was the same of cannon-balls
with that of Mr Robins, only of a larger size. His charges of powder were two, four, and eight ounces; and the results of 15 experiments which seem to have been the most accurate, are as follow.

Velocity with two ounces.	Velocity with four ounces.	Velocity with eight ounces.
702 feet in 1"	1069 feet in 1"	1419 feet in 1"
682	1020	1332
695	948	1443
703	973	1360
725	957	1412
5)3507	5)4965	5)6986
Mean velocities 701	993	1397

19 U

In

In another course, the mean velocities, with the same charges of powder, were 613, 873, 1162. "The mean velocities of the balls in the first course of experiments, says Mr Hutton, with two, four, and eight ounces of powder, are as the numbers 1, 1.414, and 1.993; but the subduplicate ratio of the weights (two, four, and eight) give the numbers 1, 1.414, and 2, to which the others are sufficiently near. It is obvious, however, that the greatest difference lies in the last number, which answers to the greatest velocity. It will fill be a little more in defect if we make the allowance for the weights of the balls; for the mean weights of the balls with the two and four ounces is 18½ ounces, but of the eight ounces it is 18½: diminishing therefore the number 1.993 in the reciprocal subduplicate ratio of 18½ to 18½, it becomes 1.985, which falls short of the number 2 by .015, or the 133d part of itself. A similar defect was observed in the other course of experiments; and both are owing to three evident causes, viz. 1. The less length of cylinder through which the ball was impelled; for with the eight-ounce charge, it lay three or four inches nearer to the muzzle of the piece than with the others. 2. The greater quantity of elastic fluid which escaped in this case than in the others by the windage. This happens from its moving with a greater velocity; in consequence of which, a greater quantity escapes by the vent and windage than in smaller velocities. 3. The greater quantity of powder blown out unfired in this case than in that of the lesser velocities; for the ball which was impelled with the greater velocity, would be sooner out of the piece than the others, and the more so as it had a less length of the bore to move through; and if powder fire in time, which cannot be denied, though indeed that time is manifestly very short, a greater quantity of it must remain unfired when the ball with the greater velocity issues from the piece, than when that which has the less velocity goes out, and fill the more so as the bulk of powder which was at first to be inflamed in the one case so much exceeded that in the others.

"Let us now compare the corresponding velocities in both cases. In the one they are, 701, 993, 1397; in the other, 613, 873, 1162. Now the ratio of the first two numbers, or the velocities with two ounces of powder, is that of 1 to 1.1436, the ratio of the next two is that of 1 to 1.1375, and the ratio of the last is that of 1 to 1.2022. But the mean weight of the shot for two and four ounces of powder, was 28½ ounces in the first course, and 18½ in this; and for eight ounces of powder, it was 28½ in the first, and 18½ in this. Taking therefore the reciprocal subduplicate ratios of these weights of shot, we obtain the ratio of 1 to 1.224 for that of the balls which were fired with two ounces and four ounces of powder, and the ratio of 1 to 1.241 for the balls which were fired with eight ounces. But the real ratios above found are not greatly different from these; and the variation of the actual velocities from this law of the weights of shot, inclines the same way in both courses of experiments. We may now collect into one view the principal inferences that have resulted from these experiments.

1. "It is evident from them, that powder fires almost instantaneously.

2. "The velocities communicated to balls or shot of the same weight with different quantities of powder, are nearly in the subduplicate ratio of these quantities; a very small variation in defect taking place when the

quantities of powder become great.

3. "When shot of different weights are fired with the same quantity of powder, the velocities communicated to them are nearly in the reciprocal subduplicate ratio of their weights.

4. "Shot which are of different weights, and impelled by different quantities of powder, acquire velocities which are directly as the square roots of the quantities of powder, and inversely as the square roots of the weights of the shot nearly."

The velocities of the bullets being thus found as Mr Ro-
nearly as possible, the ranges may be found by the fol-
lowing rules laid down by Mr Robins.

1. "Till the velocity of the projectile surpasses that of 1100 feet in a second, the resistance may be reckoned to be in the duplicate proportion of the velocity, and its mean quantity may be reckoned about half an ounce avoirdupois on a 12-pound shot moving with a velocity of about 25 or 26 feet in a second.

2. "If the velocity be greater than that of 1100 or 1200 feet in a second, then the absolute quantity of the resistance in these greater velocities will be near three times as great as it should be by a comparison with the smaller velocities.—Hence then it appears, that if a projectile begins to move with a velocity less than that of 1100 feet in 1", its whole motion may be supposed to be considered on the hypothesis of a resistance in the duplicate ratio of the velocity. And if it begins to move with a velocity greater than this last mentioned, yet if the first part of its motion, till its velocity be reduced to near 1100 feet in 1", be considered separately from the remaining part in which the velocity is less than 1100 feet in 1"; it is evident, that both parts may be truly assigned on the same hypothesis; only the absolute quantity of the resistance is three times greater in the first part than in the last. Wherefore, if the motion of a projectile on the hypothesis of a resistance in the duplicate ratio of the velocity be truly and generally assigned, the actual motions of resisted bodies may be thereby determined, notwithstanding the increased resistances in the great velocities. And, to avoid the division of the motion into two, I shall show how to compute the whole at one operation with little more trouble than if no such increased resistance took place.

"To avoid frequent circumlocutions, the distance to which any projectile would range in a vacuum on the horizontal plain at 45° of elevation, I shall call the potential random of that projectile; the distance to which the projectile would range in *vacuo* on the horizontal plane at any angle different from 45°, I shall call the potential range of the projectile at that angle; and the distance to which a projectile really ranges, I shall call its actual range.

"If the velocity with which a projectile begins to move is known, its potential random and its potential range at any given angle are easily determined from the common theory of projectiles; or more generally, if either its original velocity, its potential random, or its potential range, at a given angle, are known, the other two are easily found out.

"To facilitate the computation of resisted bodies, it is necessary, in the consideration of each resisted body, to assign a certain quantity, which I shall denominate F, adapted to the resistance of that particular projectile. To find this quantity F to any projectile given, we may proceed thus: First find, from the principles

30
Mr Ro-
bins's method of
finding the
ranges of
bullets.

See Pro-
jectile.

PRACTICE already delivered, with what velocity the projectile must move, so that its resistance may be equal to its gravity. Then the height, from whence a body must descend in a vacuum to acquire this velocity, is the magnitude of F sought. But the concise way of finding this quantity F to any shell or bullet is this: If it be of solid iron, multiply its diameter measured in inches by 300, the product will be the magnitude of F expressed in yards. If, instead of a solid iron-bullet, it is a shell or a bullet of some other substance; then, As the specific gravity of iron is to the specific gravity of the shell or bullet given, so is the F corresponding to an iron bullet of the same diameter, to the proper F for the shell or bullet given. The quantity F being thus assigned, the necessary computations of these resisted motions may be dispatched by the three following propositions, always remembering that these propositions proceed on the hypothesis of the resistance being in the duplicate proportion of the velocity of the resisted body. How to apply this principle, when the velocity is so great as to have its resistance augmented beyond this rate, shall be shewn in a corollary to be annexed to the first proposition.

Actual ranges expressed in F.	Corresponding potential ranges expressed in F.	Actual ranges expressed in F.	Corresponding potential ranges expressed in F.	Actual ranges expressed in F.	Corresponding potential ranges expressed in F.
0,01	0,0100	1,5	2,6422	3,25	13,2556
0,02	0,0201	1,55	2,7890	3,3	13,8258
0,04	0,0405	1,6	2,9413	3,35	14,44195
0,06	0,0612	1,65	3,0994	3,4	15,0377
0,08	0,0822	1,7	3,2635	3,45	15,6814
0,1	0,1034	1,75	3,4338	3,5	16,3517
0,12	0,1249	1,8	3,6107	3,55	17,0497
0,14	0,1468	1,85	3,7944	3,6	17,7768
0,15	0,1578	1,9	3,9851	3,65	18,5341
0,2	0,2140	1,95	4,1833	3,7	19,3229
0,25	0,2722	2,	4,3890	3,75	20,1446
0,3	0,3324	2,05	4,6028	3,8	21,0006
0,35	0,3947	2,1	4,8249	3,85	21,8925
0,4	0,4591	2,15	5,0557	3,9	22,8218
0,45	0,5258	2,2	5,2955	3,95	23,7901
0,5	0,5949	2,25	5,5446	4,0	24,7991
0,55	0,6664	2,3	5,8036	4,05	25,8506
0,6	0,7404	2,35	6,0728	4,1	26,9465
0,65	0,8170	2,4	6,3526	4,15	28,0887
0,7	0,8964	2,45	6,6435	4,2	29,2792
0,75	0,9787	2,5	6,9460	4,25	30,5202
0,8	1,0638	2,55	7,2605	4,3	31,8138
0,85	1,1521	2,6	7,5875	4,35	33,1625
0,9	1,2436	2,65	7,9276	4,4	34,5686
0,95	1,3383	2,7	8,2813	4,45	36,0346
1,0	1,4366	2,75	8,6492	4,5	37,5632
1,05	1,5384	2,8	9,0319	4,55	39,1571
1,1	1,6439	2,85	9,4300	4,6	40,8193
1,15	1,7534	2,9	9,8442	4,65	42,5427
1,2	1,8669	2,95	10,2752	4,7	44,3305
1,25	1,9845	3,0	10,7237	4,75	46,2860
1,3	2,1066	3,05	11,1904	4,8	48,4212
1,35	2,2332	3,1	11,6761	4,85	50,2641
1,4	2,3646	3,15	12,1816	4,9	52,4040
1,45	2,5008	3,2	12,7078	4,95	54,6363
				5,0	56,9653

PRACTICE "PROP. I. Given the actual range of a given shell or bullet at any small angle not exceeding 8° or 10° , to determine its potential range, and consequently its potential random and original velocity.

"Sol. Let the actual range given be divided by the F corresponding to the given projectile, and find the quote in the first column of the preceding Table. Then the corresponding number in the second column multiplied into F, will be the potential range sought; and thence, by the methods already explained, the potential random and the original velocity of the projectile is given.

"EXAM. An 18 pounder, the diameter of whose shot is about 5 inches, when loaded with 2lb. of powder, ranged at an elevation of $3^{\circ} 35'$, to the distance of 975 yards.

"The F corresponding to this bullet is 1500 yards, and the quote of the actual range by this number is 65; corresponding to which, in the second column, is 817; whence, 817 F, or 1225 yards, is the potential range sought; and this, augmented in the ratio of the sine of twice the angle of elevation to the radius, gives 10050 yards for the potential random; whence it will be found, that the velocity of this projectile was that of 984 feet in a second.

"Cor. 1st. If the converse of this proposition be desired; that is, if the potential range in a small angle be given, and thence the actual range be sought; this may be solved with the same facility by the same table. For if the given potential range be divided by its correspondent F, then opposite to the quote sought in the second column, there will be found in the first column a number, which multiplied into F will give the actual range required. And from hence it follows, that, if the actual range be given at one angle, it may be found at every other angle not exceeding 8° or 10° .

"Cor. 2d. If the actual range at a given small angle be given, and another actual range be given, to which the angle is sought; this will be determined by finding the potential ranges corresponding to the two given actual ranges; then the angle corresponding to one of these potential ranges being known, the angle corresponding to the other will be found by the common theory of projectiles.

"Cor. 3d. If the potential random deduced from the actual range by this proposition exceeds 13000 yards; then the original velocity of the projectile was so great as to be affected by the treble resistance described above; and consequently the real potential random will be greater than what is here determined. However, in this case, the true potential random may be thus nearly assigned. Take a 4th continued proportional to 13000 yards, and the potential random found by this proposition, and the 4th proportional thus found may be assumed for the true potential random sought. In like manner, when the true potential random is given greater than 13000 yards, we must take two mean proportionals between 13000 and this random*; and the first of these mean proportionals must be assumed instead of the random given, in every operation described in these propositions and their corollaries. And this method will nearly allow for the increased resistance in large velocities, the difference only amounting to a few minutes in the angle of direction of the projected body, which, provided that angle exceeds two

* The operations directed in this corollary are best performed by the table of logarithms.

PRACTICE or three degrees, is usually scarce worth attending to.

Of this process take the following example.

"A 24 pounder fired with 12 pounds of powder, when elevated at $7^{\circ} 15'$, ranged about 2500 yards. Here the F being near 1700 yards, the quote to be sought in the first column is 147, to which the number corresponding in the second column is 2,556; whence the potential range is near 4350 yards, and the potential random thence resulting 17400. But this being more than 13,000, we must, to get the true potential random, take a 4th continued proportional to 13000 and 17400; and this 4th proportional, which is about 31000 yards, is to be esteemed the true potential random sought; whence the velocity is nearly that of 1730 feet in a second.

"SCHOLIUM. This proposition is confined to small angles, not exceeding 8° or 10° . In all possible cases of practice, this approximation, thus limited, will not differ from the most rigorous solution by so much as what will often intervene from the variation of the density of the atmosphere in a few hours time; so that the errors of the approximation are much short of other inevitable errors, which arise from the nature of this subject.

"PROP. II. Given the actual range of a given shell or bullet, at any angle not exceeding 45° , to determine its potential range at the same angle; and thence its potential random and original velocity.

"SOL. Diminish the F corresponding to the shell or bullet given in the proportion of the radius to the cosine of $\frac{1}{2}$ of the angle of elevation. Then, by means of the preceding table, operate with this reduced F in the same manner as is prescribed in the solution of the last proposition, and the result will be the potential range sought; whence the potential random, and the original velocity, are easily determined.

"EXAM. A mortar for sea-service, charged with 30lb of powder, has sometimes thrown its shell, of $12\frac{1}{2}$ inches diameter, and of 231 lb. weight, to the distance of 2 miles, or 5450 yards. This at an elevation of 45° .

"The F to this shell, if it were solid, is 3825 yards; but as the shell is only $\frac{2}{3}$ of a solid globe, the true F is no more than 3060 yards. This, diminished in the ratio of the radius to the cosine of $\frac{1}{2}$ of the angle of elevation, becomes 2544. The quote of the potential range by this diminished F is 1,384; which sought in the first column of the preceding table gives 2,280 for the corresponding number in the second column; and this multiplied into the reduced F , produces 5800 yards for the potential range sought, which, as the angle of elevation was 45° , is also the potential random; and hence the original velocity of this shell appears to be that of about 748 feet in a second.

"COR. The converse of this proposition, that is, the determination of the actual range from the potential range given, is easily deduced from hence by means of the quote of the potential range divided by the reduced F ; for this quote searched out in the second column will give a corresponding number in the first column, which multiplied into the reduced F , will be the actual range sought.

Also, if the potential random of a projectile be given, or its actual range at a given angle of elevation; its actual range at any other angle of elevation, not greater than 45° , may hence be known. For the

PRACTICE potential random will assign the potential range at any given angle; and thence, by the method of this corollary, the actual range may be found.

"EXAM. A fit musket-bullet fired from a piece of the standard dimensions, with $\frac{7}{8}$ of its weight in good powder, acquires a velocity of near 900 feet in a second; that is, it has a potential random of near 8400 yards. If now the actual range of this bullet at 15° was sought, we must proceed thus:

"From the given potential random it follows, that the potential range at 15° is 4200 yards; the diameter of the bullet is $\frac{1}{4}$ of an inch; and thence, as it is of lead, its proper F is 3375 yards, which, reduced in the ratio of the radius to the cosine of $\frac{1}{2}$ of 15° , becomes 331 yards. The quote of 4200 by this number is 12.7 nearly; which, being sought in the second column, gives 3.2 nearly for the corresponding number in the first column; and this multiplied into 331 yards (the reduced F) makes 1059 yards for the actual range sought.

"EXAM. II. The same bullet, fired with its whole weight in powder, acquires a velocity of about 2100 feet in a second, to which there corresponds a potential random of about 45700 yards. But this number greatly exceeding 13,000 yards, it must be reduced by the method described in the third corollary of the first proposition, when it becomes 19700 yards. If now the actual range of this bullet at 15° was required, we shall from hence find, that the potential range at 15° is 9850 yards; which, divided by the reduced F of the last example, gives for a quote 2975; and thence following the steps prescribed above, the actual range of this bullet comes out 1396 yards, exceeding the former range by no more than 337 yards; whereas the difference between the two potential ranges is above ten miles. Of such prodigious efficacy is the resistance of the air, which hath been hitherto treated as too insignificant a power to be attended to in laying down the theory of projectiles!

"SCHOL. I must here observe, that as the density of the atmosphere perpetually varies, increasing and diminishing often by $\frac{1}{10}$ part, and sometimes more, in a few hours; for that reason I have not been over rigorous in forming these rules, but have considered them as sufficiently exact when the errors of the approximation do not exceed the inequalities which would take place by a change of $\frac{1}{10}$ part in the density of the atmosphere. With this restriction, the rules of this proposition may be safely applied in all possible cases of practice. That is to say, they will exhibit the true motions of all kinds of shells and cannon-shot, as far as 45° of elevation, and of all musket-bullets fired with their largest customary charges, if not elevated more than 30° . Indeed, if experiments are made with extraordinary quantities of powder, producing potential randoms greatly surpassing the usual rate; then in large angles some farther modifications may be necessary. And though, as these cases are beyond the limits of all practice, it may be thought unnecessary to consider them; yet, to enable those who are so disposed to examine these uncommon cases, I shall here insert a proposition, which will determine the actual motion of a projectile at 45° , how enormous soever its original velocity may be. But as this proposition will rather relate to speculative than practical

PRACTICE practical cases, instead of supposing the actual range known, thence to assign the potential random, I shall now suppose the potential random given, and the actual range to be thence investigated.

“PROP. III. Given the potential random of a given shell or bullet, to determine its actual range at 45°.

SOL. Divide the given potential random by the F corresponding to the shell or bullet given, and call the quotient q, and let l be the difference between the tabular logarithms of 25 and of q, the logarithm of 10 being supposed unity; then the actual range sought is $3.4 F + 2lF - \frac{11}{10} F$, where the double line of 2lF is to be thus understood; that if q be less than 25, it must be — 2lF; if it be greater, then it must be + 2lF. In this solution, q may be any number not less than 3, nor more than 2500.

“COR. Computing in the manner here laid down, we shall find the relation between the potential randoms, and the actual range at 45°, within the limits of this proposition, to be as expressed in the following table.

Potential Random.	Actual Range at 45°.
3 F	1.5 F
6 F	2.1 F
10 F	2.6 F
20 F	3.2 F
30 F	3.6 F
40 F	3.8 F
50 F	4.0 F
100 F	4.6 F
200 F	5.1 F
500 F	5.8 F
1000 F	6.4 F
2500 F	7.0 F

Whence it appears, that, when the potential random is increased from 3F to 2500F, the actual range is only increased from 1½ F to 7 F, so that an increase of 2497F in the potential random produces no greater an increase in the actual range than 5½ F, which is not its $\frac{1}{2500}$ part; and this will again be greatly diminished on account of the increased resistance, which takes place in great velocities. So extraordinary are the effects of this resistance, which we have been hitherto taught to regard as inconsiderable.

“That the justness of the approximations laid down in the 2d and 3d propositions may be easier examined; I shall conclude these computations by inserting a table of the actual ranges at 45° of a projectile, which is resisted in the duplicate proportion of its velocity. This table is computed by methods different from those hitherto described, and is sufficiently exact to serve as a standard with which the result of our other rules may be compared. And since whatever errors occur in the application of the preceding propositions, they will be most sensible at 45° of elevation, it follows, that hereby the utmost limits of those errors may be ascertained.

Potential Randoms.	Actual Range at 45°.
1 F	.0963 F
25 F	.2282 F
5 F	.4203 F
75 F	.8668 F
1.0 F	.7323 F

1.25 F	.860 F
1.5 F	.978 F
1.75 F	1.083 F
2.0 F	1.179 F
2.5 F	1.349 F
3.0 F	1.495 F
3.5 F	1.624 F
4.0 F	1.738 F
4.5 F	1.840 F
5.0 F	1.930 F
5.5 F	2.015 F
6.0 F	2.097 F
6.5 F	2.169 F
7.0 F	2.237 F
7.5 F	2.300 F
8.0 F	2.359 F
8.5 F	2.414 F
9.0 F	2.467 F
9.5 F	2.511 F
10.0 F	2.564 F
11.0 F	2.651 F
13.0 F	2.804 F
15.0 F	2.937 F
20.0 F	3.196 F
25.0 F	3.396 F
30.0 F	3.557 F
40.0 F	3.809 F
50.0 F	3.998 F

We have now only to consider that part of practical gunnery which relates to the proportions of the different parts of cannon, the metal of which they are made, &c.

Formerly the guns were made of a very great length, and were on that account extremely troublesome and unmanageable. The error here was first discovered by accident; for some cannon, having been cast by mistake two feet and an half shorter than the common standard, were found to be equally efficacious in service with the common ones, and much more manageable. This soon produced very considerable alterations in the form of the artillery throughout Europe; but in no country have greater improvements in this respect been made than in our own. For a long time brass, or rather a kind of bell-metal, was thought preferable to cast iron for making of cannon. The composition of this metal is generally kept a secret by each particular founder.

The author of the Military Dictionary gives the following proportions as the most common, viz. “To 240 lb. of metal fit for casting they put 68 lb. of copper, 52 lb. of brass, and 12 lb. of tin. To 4200 lb. of metal fit for casting the Germans put 3687½ lb. of copper, 204½ lb. of brass, and 307½ lb. of tin. Others use 100 lb. of copper, 6 lb. of brass, and 9 lb. of tin; while some make use of 100 lb. of copper, 10 lb. of brass, and 15 lb. of tin. This composition was both found to be very expensive, and also liable to great inconveniences in the using. A few years ago, therefore, a proposal was made by Mr Muller for using iron guns of a lighter construction than the brass ones, by which he supposed that a very great saving would be made in the expence; and likewise, that the guns of the Mr Muller’s new construction would be more manageable, and even less efficacious, than the old ones. “The reduction of the expence (says Mr Muller) of the very large artillery necessary for sea and land service, is to be considered un-
42-
43-
44-
45-
46-
47-
48-
49-
50-
51-
52-
53-
54-
55-
56-
57-
58-
59-
60-
61-
62-
63-
64-
65-
66-
67-
68-
69-
70-
71-
72-
73-
74-
75-
76-
77-
78-
79-
80-
81-
82-
83-
84-
85-
86-
87-
88-
89-
90-
91-
92-
93-
94-
95-
96-
97-
98-
99-
100-
101-
102-
103-
104-
105-
106-
107-
108-
109-
110-
111-
112-
113-
114-
115-
116-
117-
118-
119-
120-
121-
122-
123-
124-
125-
126-
127-
128-
129-
130-
131-
132-
133-
134-
135-
136-
137-
138-
139-
140-
141-
142-
143-
144-
145-
146-
147-
148-
149-
150-
151-
152-
153-
154-
155-
156-
157-
158-
159-
160-
161-
162-
163-
164-
165-
166-
167-
168-
169-
170-
171-
172-
173-
174-
175-
176-
177-
178-
179-
180-
181-
182-
183-
184-
185-
186-
187-
188-
189-
190-
191-
192-
193-
194-
195-
196-
197-
198-
199-
200-
201-
202-
203-
204-
205-
206-
207-
208-
209-
210-
211-
212-
213-
214-
215-
216-
217-
218-
219-
220-
221-
222-
223-
224-
225-
226-
227-
228-
229-
230-
231-
232-
233-
234-
235-
236-
237-
238-
239-
240-
241-
242-
243-
244-
245-
246-
247-
248-
249-
250-
251-
252-
253-
254-
255-
256-
257-
258-
259-
260-
261-
262-
263-
264-
265-
266-
267-
268-
269-
270-
271-
272-
273-
274-
275-
276-
277-
278-
279-
280-
281-
282-
283-
284-
285-
286-
287-
288-
289-
290-
291-
292-
293-
294-
295-
296-
297-
298-
299-
300-
301-
302-
303-
304-
305-
306-
307-
308-
309-
310-
311-
312-
313-
314-
315-
316-
317-
318-
319-
320-
321-
322-
323-
324-
325-
326-
327-
328-
329-
330-
331-
332-
333-
334-
335-
336-
337-
338-
339-
340-
341-
342-
343-
344-
345-
346-
347-
348-
349-
350-
351-
352-
353-
354-
355-
356-
357-
358-
359-
360-
361-
362-
363-
364-
365-
366-
367-
368-
369-
370-
371-
372-
373-
374-
375-
376-
377-
378-
379-
380-
381-
382-
383-
384-
385-
386-
387-
388-
389-
390-
391-
392-
393-
394-
395-
396-
397-
398-
399-
400-
401-
402-
403-
404-
405-
406-
407-
408-
409-
410-
411-
412-
413-
414-
415-
416-
417-
418-
419-
420-
421-
422-
423-
424-
425-
426-
427-
428-
429-
430-
431-
432-
433-
434-
435-
436-
437-
438-
439-
440-
441-
442-
443-
444-
445-
446-
447-
448-
449-
450-
451-
452-
453-
454-
455-
456-
457-
458-
459-
460-
461-
462-
463-
464-
465-
466-
467-
468-
469-
470-
471-
472-
473-
474-
475-
476-
477-
478-
479-
480-
481-
482-
483-
484-
485-
486-
487-
488-
489-
490-
491-
492-
493-
494-
495-
496-
497-
498-
499-
500-
501-
502-
503-
504-
505-
506-
507-
508-
509-
510-
511-
512-
513-
514-
515-
516-
517-
518-
519-
520-
521-
522-
523-
524-
525-
526-
527-
528-
529-
530-
531-
532-
533-
534-
535-
536-
537-
538-
539-
540-
541-
542-
543-
544-
545-
546-
547-
548-
549-
550-
551-
552-
553-
554-
555-
556-
557-
558-
559-
560-
561-
562-
563-
564-
565-
566-
567-
568-
569-
570-
571-
572-
573-
574-
575-
576-
577-
578-
579-
580-
581-
582-
583-
584-
585-
586-
587-
588-
589-
590-
591-
592-
593-
594-
595-
596-
597-
598-
599-
600-
601-
602-
603-
604-
605-
606-
607-
608-
609-
610-
611-
612-
613-
614-
615-
616-
617-
618-
619-
620-
621-
622-
623-
624-
625-
626-
627-
628-
629-
630-
631-
632-
633-
634-
635-
636-
637-
638-
639-
640-
641-
642-
643-
644-
645-
646-
647-
648-
649-
650-
651-
652-
653-
654-
655-
656-
657-
658-
659-
660-
661-
662-
663-
664-
665-
666-
667-
668-
669-
670-
671-
672-
673-
674-
675-
676-
677-
678-
679-
680-
681-
682-
683-
684-
685-
686-
687-
688-
689-
690-
691-
692-
693-
694-
695-
696-
697-
698-
699-
700-
701-
702-
703-
704-
705-
706-
707-
708-
709-
710-
711-
712-
713-
714-
715-
716-
717-
718-
719-
720-
721-
722-
723-
724-
725-
726-
727-
728-
729-
730-
731-
732-
733-
734-
735-
736-
737-
738-
739-
740-
741-
742-
743-
744-
745-
746-
747-
748-
749-
750-
751-
752-
753-
754-
755-
756-
757-
758-
759-
760-
761-
762-
763-
764-
765-
766-
767-
768-
769-
770-
771-
772-
773-
774-
775-
776-
777-
778-
779-
780-
781-
782-
783-
784-
785-
786-
787-
788-
789-
790-
791-
792-
793-
794-
795-
796-
797-
798-
799-
800-
801-
802-
803-
804-
805-
806-
807-
808-
809-
810-
811-
812-
813-
814-
815-
816-
817-
818-
819-
820-
821-
822-
823-
824-
825-
826-
827-
828-
829-
830-
831-
832-
833-
834-
835-
836-
837-
838-
839-
840-
841-
842-
843-
844-
845-
846-
847-
848-
849-
850-
851-
852-
853-
854-
855-
856-
857-
858-
859-
860-
861-
862-
863-
864-
865-
866-
867-
868-
869-
870-
871-
872-
873-
874-
875-
876-
877-
878-
879-
880-
881-
882-
883-
884-
885-
886-
887-
888-
889-
890-
891-
892-
893-
894-
895-
896-
897-
898-
899-
900-
901-
902-
903-
904-
905-
906-
907-
908-
909-
910-
911-
912-
913-
914-
915-
916-
917-
918-
919-
920-
921-
922-
923-
924-
925-
926-
927-
928-
929-
930-
931-
932-
933-
934-
935-
936-
937-
938-
939-
940-
941-
942-
943-
944-
945-
946-
947-
948-
949-
950-
951-
952-
953-
954-
955-
956-
957-
958-
959-
960-
961-
962-
963-
964-
965-
966-
967-
968-
969-
970-
971-
972-
973-
974-
975-
976-
977-
978-
979-
980-
981-
982-
983-
984-
985-
986-
987-
988-
989-
990-
991-
992-
993-
994-
995-
996-
997-
998-
999-
1000-

PRACTICE

der two heads: the one, To diminish the weight; and the other, Not to use any brads field-artillery, but only iron, to lessen the great burden of our ships of war, and to carry larger calibers than those of other nations of the same rate. If the weights of our guns are diminished, they will require fewer hands to manage them, and of consequence a smaller number will be exposed to danger at a time: and if we carry larger calibers, our rates will be a match for larger ships.

"The advantage of using iron guns in the field instead of brads, will be that the expences are lessened in proportion to the cost of brads to that of iron, which is as 8 to 1.

"The only objection against iron is, its pretended brittleness: but as we abound in iron that is stronger and tougher than any brads, this objection is invalid. This I can assert; having seen some that cannot be broke by any force, and will flatten like hammered iron: if then we use such iron, there can be no danger of the guns bursting in the most severe action.

"Though brads guns are not liable to burst, yet they are sooner rendered unserviceable in action than iron. For by the softness of the metal, the vent widens so soon, and they are so liable to bend at the muzzle, that it would be dangerous to fire them; as we found by experience at Belleisle, and where we were obliged to take guns from the ships to finish the siege.

"These being undeniable facts, no possible reason can be assigned against using iron guns in both sea and land service, and thereby lessen the expences of artillery so considerably as will appear by the following tables.

Lengths and Weights of Iron Ship-Guns.

OLD PIECES. NEW PIECES.

Calib.	Length.	Weight.	Calib.	Length.	Weight.
	Ft. In.			Ft. In.	
3	4 6	7 1 7	3	3 6	3 3 0
4	6 0	12 2 13	6	4 4	7 2 0
6	7 0	17 1 14	9	5 0	11 1 0
9	7 0	23 2 2	12	5 6	15 0 0
12	9 0	32 3 3	18	6 4	22 2 0
18	9 0	41 1 8	24	7 0	30 0 0
24	9 0	48 0 0	32	7 6	40 0 0
32	9 6	53 3 23	42	8 4	52 2 0
42	10 0	55 1 12	48	8 6	60 0 0

"Guns of this construction appear sufficiently strong from the proof of two three-pounders made for Lord Egmont, and they even may be made lighter and of equal service.

Length and Weight of Battering Pieces.

PRACTICE

OLD BRASS.

NEW IRON.

Calib.	Length.	Weight.	Calib.	Length.	Weight.
	Ft. In.			Ft. In.	
6	8 0	19 1 0	6	6 1	9 1 0
9	9 0	25 0 0	9	7 0	14 0 0
12	9 0	29 0 0	12	7 8	18 0 0
18	9 6	48 0 0	18	9 0	29 1 0
24	9 6	51 0 0	24	9 8	37 3 0
32	10 0	55 2 0	32	9 0	42 0 0
Total 227.			Total 141.		

Diff. 72.

"That these guns are sufficiently strong, is evident from the former trial; besides, there are several 32 pounders of the same dimensions and weight now existing and serviceable, though cast in king Charles the Second's time.

N. B. These battering pieces may serve in gar-risons.

"It appears from these tables, that no proportion has been observed in any guns hitherto made, in respect to their length or weight, but merely by guess.

Some Examples to shew what may be saved by this Scheme.

The Royal George carries 100 brads guns, which weigh together 218.2 tons; the ton costs 130 pounds, workmanship included.

The expence of these guns is then 28366 pounds

A set of the iron guns of the same number and calibers, according to my construction, weighs 127.8 tons

The ton costs 16 pounds, and the whole set 2044.8 pounds

The Royal George carries then 90.4 tons more than is necessary, and the difference between the expence is 26321.2 pounds

That is, 12.5 times more than the new iron set costs: or 12 ships of the same rate may be fitted out at less charge.

A set of the { Old } iron guns for a { 204.4 } tons
 { New } first-rate weighs { 127.8 }

The difference between the weight of the old and new is 76.6 tons

The difference between the expence is then 1225.6 pounds

A set of brads battering pieces weighs 11.36 tons

A ton costs 130 pounds, and the set 1476.8 pounds

A set of the new weighs 7.55 tons

The ton costs 16 pounds, and the set 117.8 pounds

That is, the old set costs 11 times, and 632 over, more than the new set; or eleven sets of the new could be made at less expence than one of the old.

"This table shews what may be saved in the navy; and if we add those on board sloops, the different gar-risons, and the field-train, with the great expence of their

PRACTICE their carriage in the field, it may be found pretty near as much more.

shews the size of the ball. Fig. 10. shews a cohorn made also at Carron, and which may be measured by the same scale.

PRACTICE

44
Use and description of carriages.

Numb. of Guns	Weight of Old.	Weight of New.	Differ.	No of Ships	Total Difference
100	4367	3 2556	0 1811	3	5 9058 0
90	3537	3 2001	0 1536	3	9 13827 3
80	3108	3 1827	0 1287	3	7 9014 1
74	1091	0 1840	2 1250	2	32 40016 0
70	2997	0 1796	2 1200	2	10 12005 0
64	2543	3 1305	0 1258	2	23 28485 2
60	2177	3 1185	0 972	3	30 29782 2
50	1881	1 1035	0 846	1	19 16078 3
44	1365	2 705	0 660	2	8 5284 0
40	1234	2 312	2 922	0	9 8298 0
36	963	3 450	0 513	3	7 3596 1
32	956	2 435	0 521	2	28 14602 0
28	593	2 285	0 308	2	23 7095 1
24	531	3 255	0 276	3	12 3321 0
20	421	2 191	1 230	1	15 3453 3

Difference between the weights - 203918 3 0
Expences of the } Brass guns of two first rates, 203918 15 0
Iron ditto - 43109 5 0

We get L. 257018 0 0

This and other propofals for reducing the weight and expence of guns have been greatly attended to of late; and the Carron-company in Scotland have not only greatly improved those of the old construction, but a gun of a new construction hath been invented by Mr Charles Gascoigne director of that work, which promises to be of more effectual service than any hitherto made use of.—Fig. 9. represents the form and proportions of the guns made at Carron, and which serve for those of all sizes, from $\frac{1}{2}$ pounders and upwards. The proportions are measured by the diameters of the caliber, or bore of the gun, divided into 16 equal parts, as represented in the figure. The following are the names of the different parts of a cannon.

- A B, the length of the cannon.
- A E, the first reinforce.
- E F, the second reinforce.
- F B, the chafe.
- H B, the muzzle.
- A o, the cascabel, or pomiglon.
- A C, the breech.
- C D, the vent-field.
- F I, the chafe-girdle.
- r s, the base-ring and ogee.
- t, the vent-aftragal and fillets.
- p q, the first reinforce-ring and ogee.
- v w, the second reinforce-ring and ogee.
- x, the chafe-aftragal and fillets.
- z, the muzzle-aftragal and fillets.
- n, the muzzle-mouldings.
- m, the swelling of the muzzle.
- A i, the breech-mouldings.
- T T, the trunnions.

The dotted lines along the middle of the piece shew the dimensions of the calibre, and the dotted circle

As the breech of the cannon receives an equal impulse with the bullet from the action of the inflamed gunpowder, it thence follows, that, at the moment the bullet flies off, the piece itself pushes backward with very great force. This is called the *recoil* of the cannon; and if the piece is not of a very considerable weight, it would fly upwards, or to a side, with extreme violence. If again it was firmly fastened down, so that it could not move in the least, it would be very apt to burst, on account of the extreme violence with which the powder would then act upon it. For this reason it hath been found necessary to allow the recoil to take place, and consequently all large pieces of artillery are mounted upon carriages with wheels, which allow them to recoil freely; and thus they may be fired without any danger. There are several sorts of carriages for ordnance, viz. ballard carriages, with low wheels and high wheels; sea-carriages, made in imitation of those for ship-guns; and carriages for field-pieces, of which there are two kinds. The carriages must be proportioned to the pieces mounted on them. The ordinary proportion is for the carriage to have once and a half the length of the gun, the wheels to be half the length of the piece in height. Four times the diameter or caliber gives the depth of the planks in the fore end; in the middle, 3 $\frac{1}{2}$.

Fig. 11. shews Mr Gascoigne's newly-invented gun called a *carronade*; and which, in June 1779, of the Carronade. was by the king and council instituted a standard navy-gun, and 10 of them appointed to be added to each ship of war, from a first-rate to a sloop. Of this gun the Carron Company have published the following account.

"The carronade is made so short, that it is worked with its carriage in the ship's port; the trunnions lying immediately over the sill of the port: it is correctly bored; and the shot, being perfectly round, fills the caliber with such exactness, that the least possible of the impulse of the powder escapes, upon explosion, between the cylinder and the shot; which last also is thereby more truly directed in its flight. The bottom of the cylinder is a hemisphere, to which the end of the cartridge is not liable to stick, and in which the smallest charge of powder envelopes the shot, exhausting nearly the whole of its impelling force upon it: the trunnions are placed so as to lessen the recoil, and that the gun cannot rest against the sides of the carriage, and is balanced with the utmost facility. There are views cast upon the vent and muzzle, to point the gun quickly to an object at 250 and 500 yards distance. There is an handle A fixed upon the pommel-end of the gun, by which it is horizontally ranged and pointed; and there is a ring cast upon the cascabel, through which the breechin rope is reeved, the only rope used about these guns.

"The carronade is mounted upon a carriage B, with a perfectly smooth bottom of strong planks, without trucks; instead of which there is fixed on the bottom of the carriage, perpendicular from the trunnions, a gudgeon C of proper strength, with an iron washer D and pin E at the lower end thereof. This gudgeon is let into a corresponding groove F, cut in a second carriage

carriage

43
Proportions, &c. of the guns made at Carron.

PRACTICE

carriage G, called a *slide-carriage*; the waffer supported by the pin over-reaching the under-edges of the groove H. This *slide-carriage* is made with a smooth upper surface, upon which the gun-carriage is moved, and by the gudgeon always kept in its right station to the port; the groove in the *slide-carriage* being of a sufficient length to allow the gun to recoil, and be loaded within board. The *slide-carriage*, the groove included, is equally broad with the fore-part of the gun-carriage, and about four times the length; the fore-part of the *slide-carriage* is fixed by hinge-bolts I, to the quick-work of the ship below the port, the end lying over the fill, close to the outside plank, and the groove reaching to the fore end; the gudgeon of the gun-carriage, and consequently the trunnions of the gun, are over the fill of the port, when the gun is run out; and the port is made of such breadth, with its sides bevelled off within board, that the gun and carriage may range from bow to quarter. The *slide-carriage* is supported from the deck at the hinder end, by a wedge K, or step-floor; which being altered at pleasure, and the fore-end turning upon the hinge-bolts, the carriage can be constantly kept upon an horizontal plane, for the more easy and quick working of the gun when the ship lies along.

"The gun and carriages being in their places, the breechin rope, which must be strong and limber, is reeved through the ring on the breech, then led thro' an eye-bolt drove downwards, the eye standing upright upon the upper edge of each cheek of the gun-carriage; from these eye-bolts the ends of the breechin rope are seized down as usual to an eye-bolt driven into the quick-work on each side, in a line with the lower surface of the *slide-carriage*.

"The gun being mounted and ready for action, is loaded with $\frac{1}{16}$ th part of the weight of its ball in service charge of powder put into a woollen cartridge, and the end tied up with a worsted yarn, and placed next to the shot; and with a single ball, well rammed home upon the powder, without a wadding between them; the gun being then run out in the port, is ranged and elevated with great facility, by means of the handle on the pommel; and, by the views, very quickly pointed.—Upon discharge, the gun attempts to kick upwards, which being prevented by the waffer of the gudgeon bearing hard against the under part of the *slide-carriage*, the recoil takes place; and the gudgeon sliding backwards in the groove, (the waffer still bearing against an iron plate on the under edge of the groove,) till the gun is brought up by the breechin rope, as much re-action succeeds as slackens the rope, so that the gun and carriage may be instantly turned fore and aft by the handle, and loaded again.

"This gun has many singular advantages over the others of light construction.—It is so extremely light, that the smallest ships can carry almost any weight of shot, (the 12-pounder weighing under 500 wt. and the other calibers in proportion,) and that without being attended with the inconveniences imputed generally to light guns, since it cannot injure its carriage, or jump out of its station in the port upon recoil; and it will never heat.

"It can be easily managed and worked of all calibers, from the 12-pounders downwards with two hands,

and the 18 and 24-pounders with three hands. It may be readily ranged, pointed, and discharged, twice in three minutes, which doubles the strength of the ship against an enemy of equal force. It is wrought upon an horizontal plane to windward or to leeward, how much soever the ship lies along under a profluse of fail; and therefore, besides being hampered with no tackles or other ropes, except the breechin rope, it may be worked with as much ease and expedition in chace or in a gale of wind, as in lying to for action.—It can be ranged from bow to quarter, so as to bring a broadside to bear in a circuit of above 10 points of the compass on each side.—It is no more expensive in ammunition than the old guns of two-thirds less weight of shot; and it requires very few hands above the compliment necessary for navigating merchant-ships; and increases the strength of privateers crews, by exposing few hands at the guns, and augmenting the number at small arms.

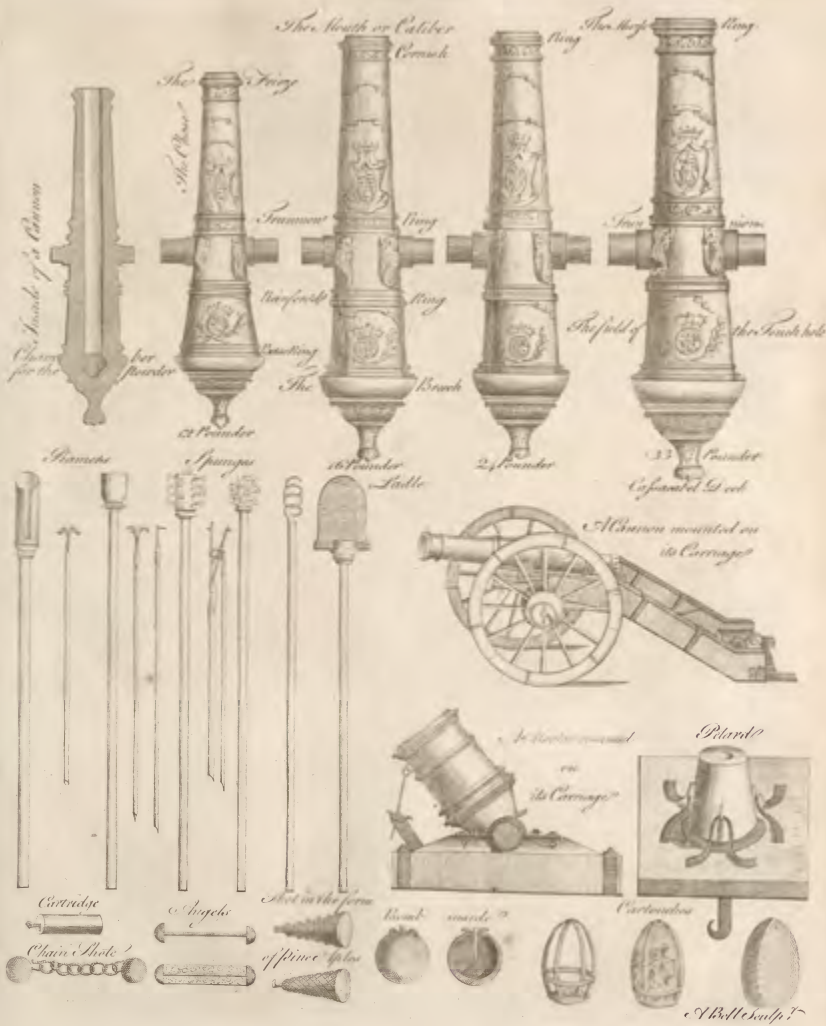
"Though the carronade cannot, strictly speaking, throw its shot to an equal distance with a longer gun; yet, from the fitness of the shot to its cylinder, the powers of this gun will greatly surpass the expectations of such as are not intimately acquainted with the effects of the elastic force of fired powder, since, with a $\frac{1}{16}$ th part of the weight of its ball, at very small elevations, it will range its shot to triple the distance at which ships generally engage, with sufficient velocity for the greatest execution, and with all the accuracy in its direction that can be attained from guns of greater lengths.

"There have been two seeming disadvantages imputed to this gun, which it does not merit, viz. the nicety of fitting the shot to the bore of the gun, and its incapacity to hold more than two shot at one charge. But, as seamen have few opportunities of confirming themselves in just opinions by experiments made on shore, and cannot, in that case, be fully conversant with the subject; the following loose hints may not be inept towards removing these objections.

"It is an axiom in projectiles, That a shot cannot be impelled from a gun to any distance in a direction truly parallel to the axis of the cylinder of the piece, or what is commonly called *point-blank*, arising from several well-known causes: for, however just may be the cylinder, and however perfect and smooth may be the sphere of its corresponding shot, and admitting that the impulse of the powder acts through the centre of gravity of the shot, and also that the shot consequently leaves the piece in a direction parallel to the axis of its cylinder; yet is the shot no sooner discharged, but it becomes more or less infected by its gravity, and deflected, according to its velocity, by the resistance of the air and wind.

"These irregularities are of little importance in close sea-fights, and, being the effect of natural causes, are common to all. Besides these, the deviation of a shot from its true direction, is further augmented by the windage between the cylinder and its shot; but the greatest uncertainty in the flight of a shot, making allowance for the action of its gravity, and the air's resistance, springs from the defects of the shot itself. Round-shot for ship-guns, are seldom nicely examined; and, unless they are cast *solid and truly globular*, and free

46
Objections
to its use
answered.





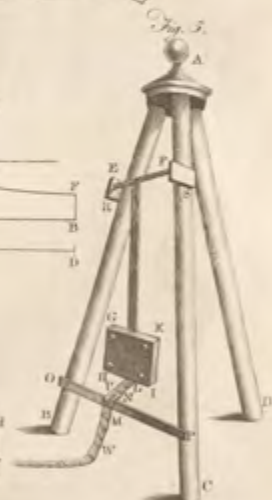
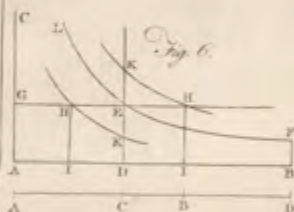
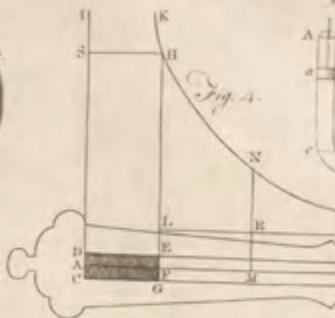


Fig. 9.





PRACTICE free of all hollows, roughness, and other outside blemishes, and well fitted to the gun, it cannot even be discharged in the direction of the axis of the piece; to the disappointment of those that use such, and to the discredit of the gun-founder, however justly the piece is viewed, or disparaged; but, being impelled against the surface of the cylinder, bounds and rebounds from side to side, acquires a rotatory motion, and when cast hollow withal, and breaking within the cylinder before discharge, (which sometimes happens, especially with double charges) never fails to injure; and, when often repeated, may, at last, burst the very best guns.

—Round-shot should not be taken on board a ship, without being examined as to its shape and surface, gaged for its size to the caliber of the gun, and weighed that it be not above or below the standard more than half an ounce in the pound of its respective caliber: good shot then, being of the same importance to all guns, removes the first objection.

“If the direction of the flight of a shot to its object is affected by so many seeming trivial causes, how much more uncertain must it be, when two or more shot are discharged together from one gun? for the shot next the powder being impelled with more celerity than that immediately before it, strikes against it after discharge, and sometimes shivers itself to pieces, and never fails to change obliquely the direction of both; and this happens with round and double-headed, &c. and all double charges; and which, from their various figures, cannot reach an object at the same elevations with the round-shot; especially when these other shots are of greater weight than the round, which

is often the case. However frightful a broadside with double charges may appear at sea, more confusion is created by them, and more time lost, *within board*, by the strain and excessive recoil, than real damage done *without board* by the additional charge: for, upon a trial on shore, where the effect can be traced, it will be found, that, at 100 yards distance, more shot will take place within a small compass by single than by double charges; and the charges will be oftener repeated in a given time, without heating the gun: and these facts being established, remove also the second objection.”

The following account of the proof of one of these guns will perhaps serve to give a more adequate idea of the great usefulness of them, than any description:

“On Monday, Oct. 4, 1779, there was an experiment made at Carron, before the earl of Dunmore, &c. &c. with a 68-pounder Carronade, nearly of the weight of a British navy 12-pounder gun, and charged with the same quantity (viz. 6 lb.) of powder.—The carronade was mounted, on its proper carriages, into a port of the dimensions of a 74 gun ship's lower-deck port; was pointed without elevation, at a centre of eight inches diameter, marked on a bulk's head of the thickness of two feet five inches solid wood, at 163 yards distance; behind which, at 168 yards, there was another bulk's head of two feet four inches thick; and behind that again, at 170 yards distance, a bank of earth. The shot pierced the bulk's heads each time, and was buried from three to four feet into the bank, and the splinters were thrown about to a considerable distance on all sides.

1st shot struck	1 foot 7 inches below the horizontal line,	and 5 feet	—	from the mark.
2d ditto	ditto	—	—	—
3d d°. d°.	through the horizontal line	d°. and 3 d°.	4 inches	from d°.
4th d°. d°.	ditto	—	—	—
5th d°. d°.	ditto	d°. and 2 d°.	4 ditto	from d°.
6th d°. d°.	2 inches below	—	2 d°. 10 d°.	from d°.
7th d°. d°.	2 inches below	—	—	10 d°. from d°.
8th d°. d°.	2 inches below	—	—	7 d°. from d°.
9th d°. d°.	2 feet below	—	—	10 d°. from d°.
10th d°. d°.	3 inches below	—	1 foot 9 d°.	from d°.
		—	—	3 d°. from d°.

“The Carronade was laid each time by the views without an instrument; and the shot were all to the left of the mark, owing to a small error in disparting the views; the third, fourth, and fifth shot, made one fracture, as did also sixth, seventh, and eighth, and the sixth and eighth struck the same spot.

“The Carronade was easily worked with four men, and may be readily worked and discharged on board a ship twice a-minute with six men.—With six pound weight of powder the shot was impelled with a velocity of 1400 feet a second.”

We have already seen of how much consequence rifle-barrels are in order to bring the art of gunnery to perfection; as they enlarge the space in which the ball will fly without any lateral deflection to three or four times its usual quantity. This improvement, however, till very lately, only took place in musket-barrels. But in the beginning of the year 1774, Dr Lind, and Captain Alexander Blair of the 69th regiment of foot, invented a species of rifled field-pieces. They are made of cast iron; and are not bored like the common pieces, but have the rifles moulded on the core, after which they are cleaned out and finished

with proper instruments; but for the method of doing this, and of boring the ordinary pieces, see the articles ORDNANCE and RIFLE.

Guns of this construction, which are intended for the field, ought never to be made to carry a ball of above one or two pounds weight at milt; a leaden bullet of that weight being sufficient to destroy either man or horse.—A pound-gun, of this construction, of good metal, such as is now made by the Carron company, need not to weigh above an hundred pounds weight, and its carriage about another hundred. It can, therefore, be easily transported from place to place, by a few men; and a couple of good horses may transport six of these guns and their carriages, if put into a cart.

But, for making experiments, in order to determine the resistance which bodies moving with great velocities meet with from the air, a circumstance to which these guns are particularly well adapted, or for annoying an enemy's sappers that are carrying on their approaches towards a besieged place, a larger caliber may be used.

The length of the gun being divided into seven equal

47
Description
of rifled
ordnance.

equal parts, the length of the first reinforce AB is two of these parts; the second BC, one and $\frac{1}{2}$ of the diameter of the caliber; the chafe CD, four wanting $\frac{1}{5}$ of the diameter of the caliber.

The distance from the hind-part of the base-ring A, to the beginning of the bore, is one caliber and $\frac{1}{2}$ of a caliber. The trunnions TT are each a caliber in breadth, and the same in length; their centres are placed three-sevenths of the gun's length from the hind part of the base-ring, in such a manner, that the axis of the trunnions passes through the centre line of the bore, which prevents the gun from kicking, and breaking its carriage. The length of the cascade is one caliber and $\frac{1}{2}$ of a caliber.

Fig. 12.

The caliber of the gun being divided into 16 equal parts;

The thickness of metal at the base-ring A from the bore, is	18,5
At the end of the first reinforce ring B	17
At the same place, for the beginning of the second reinforce	17
At the end of the second reinforce C	15
At the same place, for the beginning of the chafe c	13,75
At the end of the chafe or muzzle, the mouldings a D excluded	9
At the swelling of the muzzle b	12
At the muzzle-fillet c	9,5
At the extreme moulding D	8
Base-ring	5,5
Ogee next the base-ring d	5,5
The astragal or half-round	4,75
Its fillet	1
Total astragal and fillets at the ventfield e	4
First reinforce ring B	4,5
Second reinforce ring C	3,5
Its ogee	3
Its astragal	1,5
And its fillet	1
The muzzle astragal, and fillet a	4
Breadth of the fillet at the base-ring	1
Distance of the fillet at the button from the fillet at the base-ring	5
Breadth of the fillet at the button	1
Diameter of the fillet at the button	18
Distance of the centre of the button from its fillet	12
Diameter of the button E	18
Diameter of its neck	10,5

The vent should be placed about half an inch from the bottom of the chamber or bore, that the cartridge may be pricked, lest some of the bottoms of the cartridges should be left in when the gun is sponged, a circumstance which might retard the firing till the shot be again drawn (which is no easy matter), and the gun be cleaned out. From some experiments of colonel Desaguliers and Mr Muller, it has been imagined, that the powder never has so strong an effect as when it is fired close to the bottom of the bore; yet it is found, by the experiments of Count de la Lippe, to have the greatest effect when fired near to the middle of the charge. This he proved by firing it with tubes, introduced at a vent bored through the button and breech of the gun, of different lengths,

so as to reach the different parts of the powder. In the same manner, a musket or fowling-piece is found to push more when the touch-hole is placed at some little distance from the bottom of the bore; which arises from nothing but the powder's acting with more force, by being inflamed to greater advantage; consequently, in this case, the same quantity of powder will have a greater effect, than when the touch-hole is placed at the bottom of the bore, which may be of some use in hulbanding the powder.

The above dimensions are taken from some elegant $\frac{1}{2}$ pound guns, which were made for the prince of Asturias by the Carron company.

The rifles make one spiral turn in the length of the bore; but go no nearer to the breech, in their full size, than two calibers; and then terminate with a gentle slope in half a caliber more, so as not to prevent the cartridge with the powder from being easily sent home to the bottom of the gun, which would otherwise constantly happen with the flannel cartridges, and even sometimes with paper ones, if not made to enter very loosely. The shape of the rifles is semicircular, their breadth being equal to the diameter, which is $\frac{1}{2}$ of a caliber, and their depth equal to the semidiameter, or $\frac{1}{4}$ of a caliber.

The bullets, fig. 13, are of lead, having six knobs cast on them to fit the rifles of the gun. Being thus made of soft metal, they do not injure the rifles; and may also save an army the trouble of carrying a great quantity of shot about with them, since a supply of lead may be had in most countries from roofs, &c. which can be cast into balls as occasion requires. Lead likewise being of greater specific gravity than cast-iron, flies to a much greater distance.

Rifled ordnance of any caliber might be made to carry iron shot, for battering or for other purposes; provided holes, that are a little wider at their bottoms than at their upper parts, be cast in a zone round the ball, for receiving afterwards leaden knobs to fit the rifles of the cannon; by which means, the iron shot will have its intended line of direction preserved, without injuring the rifles more than if the whole ball was of lead, the rotatory motion round its axis, in the line of its direction, (which corrects the aberration), being communicated to it by the leaden knobs, following the spiral turn of the rifles in its progress out of the gun. It is particularly to be observed, that the balls must be made to go easily down into the piece, so that the cartridge with the powder and the bullet may be both sent home together, with a single push of the hand, without any wadding above either powder or ball; by which means, the gun is quickly loaded, and the ball flies farther than when it is forcibly driven into the gun, as was found from many experiments. The only reason why, in common rifled muzzles, the bullets are rammed in forcibly, is this, that the zone of the ball which is contiguous to the inside of the bore may have the figure of the rifles impressed upon it, in such a manner as to become part of a male screw, exactly fitting the indents of the rifle, which is not at all necessary in the present case, the figure of the rifles being originally cast upon the ball. These knobs retard the flight of the bullet in some degree; but this small disadvantage is fully made up by the ease with which the gun is loaded,

43.
Sect. III.
telescope
belonging
to this
kind of
ordnance.

its service being nearly as quick as that of a common field-piece; and the retardation and quantity of the whirling motion which is communicated to the bullet being constantly the same, it will not in the least affect the experiments made with them, in order to determine the resistance of the air.

In order to hit the mark with greater certainty than can be done in the common random method, these guns are furnished with a sector, the principal parts of which are, 1. The limb, which is divided in such a manner as to shew elevations to 15 or 20 degrees. The length of the radius is five inches and an half, and its nonius is so divided as to shew minutes of a degree. 2. The telescope, AB, fig. 14. an achromatic refractor, is seven inches in length, (such as is used on Hadley's quadrants, that are fitted for taking distances of the moon from the sun or stars, in order to obtain the longitude at sea), having cross hairs in it. 3. The parallel cylindric bar, CD, is $\frac{1}{4}$ of an inch in diameter, having two rectangular ends EF, each half an inch square and an inch long. On one side of the end next the limb of the sector, is a mark corresponding to a similar one on the hinder cock of the gun, with which it must always coincide when placed on the gun. The length of the parallel bar, together with its ends, is 7 inches. This bar is fixed to the sector by means of two hollow cylinders, G, H, which allow the sector a motion round the bar. There is a finger-screw, a, upon the hollow cylinder G, which is slit, in order to tighten it at pleasure upon the bar. 4. The circular level I, fig. 14. and 15. for setting the plane of the sector always perpendicular when placed upon the gun, is $\frac{1}{4}$ of an inch in diameter. There is a small screw, d, to adjust the level at right angles to the plane of the sector. 5. The finger screw, b, for fixing the index of the sector at any particular degree of elevation proposed.

The line of collimation (that is, the line of vision cut by the intersecting point of the two cross-hairs in the telescope) must be adjusted truly parallel to the bar of the sector when at 0 degrees. This is done by placing the sector so that the vertical hair may exactly cover some very distant perpendicular line. If it again covers it when the sector is inverted, by turning it half round upon the bar, which has all the while been kept steady and firm, that hair is correct; if not, correct half the error by means of the small screws, c d e, fig. 14. and 16. at the eye-end of the telescope, and the other half by moving the bar; place it again to cover the perpendicular line, and repeat the above operation till the hair covers it in both positions of the sector. Then turn the sector, till the horizontal hair cover the same perpendicular line; and turning the sector half round on its bar, correct it, if wrong, in the same manner as you did the vertical hair.

N. B. Of the four small screws at the eye-end of the telescope, those at the right and left hand move whatever hair is vertical, and those at top or underneath move whatever hair is horizontal.

On the side of the gun upon the first reinforce, are cast two knobs, F, fig. 12. and 17. having their middle part distant from each other six inches, for fixing on the brass locks, A, fig. 17. and 18. which seize the rectangular ends of the parallel cylindric bar of the sector, when placed on the gun.

The next adjustment is to make the parallel bar, and line of collimation of the telescope, when set at 0 degrees, parallel to the bore of the gun, and consequently to the direction of the shot. The gun being loaded, the cartridge pricked, and the gun primed, place the sector in the cocks of the gun; and having first set the sector to what elevation you judge necessary, bring the intersection of the cross-hairs in the telescope, upon the center of the mark, the limb of the sector being set vertical by means of the circular level, and then take off the sector without moving the gun. Fire the gun; and if the bullet hits any where in the perpendicular line, passing through the centre of the mark, the line of collimation of the telescope and direction of the shot agree. But if it hit to the right of the mark, so much do they differ. In order to correct which, bring the gun into the same position it was in before firing, and secure it there. Then file away as much of the fore-cock, on the side next the gun, as will let the intersection of the cross-hair fall somewhere on the line passing perpendicularly through the point where the shot fell; and it is then adjusted in that position, so much being filed off the side of the cock at a, fig. 17. and 18. as will allow the side b to be screwed closer, that the ends of the parallel bar may have no shake in the cocks. To correct it in the other position, and so to find the true 0 degrees of the gun, that is, to bring the line of collimation of the telescope, parallel-bar, and bore of the gun, truly parallel to each other, repeat the above with the trunnions perpendicular to the horizon, the sector being turned a quarter round upon its bar, so as to bring its plane vertical. The deviation of the shot found in this way is corrected by deepening one of the cocks, so that the vertical hair of the telescope may be brought to cover the line passing perpendicularly through the point where the bullet hits; the gun being placed in the same position it was in before it was fired. This adjustment being repeated two or three times, and any error that remains being corrected, the gun is fit to be mounted on its carriage for service. It is to be observed, that this sector will fit any gun, if the cocks and rectangular ends, &c. of the parallel bar be of the above dimensions, and will be equally applicable to all such pieces whose cocks have been adjusted, as if it had been adjusted separately with each of them. And if the sector be set at any degree of elevation, and the gun moved so as to bring the intersection of the cross-hairs on the object to be fired at (the limb of the sector being vertical), the bore of the gun will have the same elevation above it, in the true direction of the shot, whatever position the carriage of the gun is standing in. A telescope with cross-hairs, fixed to a common rifled musket, and adjusted to the direction of the shot, will make any person, with a very little practice, hit an object with more precision than the most experienced marksman.

For garrison-service, or for batteries, the ship or ⁴⁹their carriage, with two iron staples on each side ⁴⁹rigs, to put through a couple of poles to carry these guns from place to place with more dispatch, are as proper as any. But, for the field, a carriage like that at fig. 19. where the shafts push in upon taking out the iron pins a b, and moving the cross bar A,

PRACTICE

upon which the breech of the gun rests, as far down as the shafts were pushed in, is the property, since the whole can then be carried like a hand-barrow, over ditches, walls, or rough ground, all which may be easily understood from the figure.

The principal advantage that will accrue from the use of rifled ordnance, is the great certainty with which any object may be hit when fired at with them, since the shot deviates but little from its intended line of direction, and the gun is capable of being brought to bear upon the object, with great exactness, by means of the telescope and cross-hairs.

50
Mortars de-
scribed.

THE other pieces of artillery commonly made use of are mortars, howitzers, and royals. The mortars are a kind of short cannon of a large bore, with chambers for the powder, and are made of brass or iron. Their use is to throw hollow shells filled with powder, which falling on any building, or into the works of a fortification, burst, and with their fragments destroy every thing near them. Carcasses are also thrown out of them; which are a sort of shells with five holes, filled with pitch and other materials, in order to set buildings on fire; and sometimes baskets full of stones, of the size of a man's fist, are thrown out of them upon an enemy placed in the covert-way in the time of a siege. Of late the ingenious General Desaguliers has contrived to throw bags filled with grape-shot, containing in each bag from 400 to 600 shot of different dimensions, out of mortars. The effect of these is tremendous to troops forming the line of battle, passing a defile, or landing, &c. the shot pouring down like a shower of hail on a circumference of above 300 feet.

Mortars are chiefly distinguished by the dimensions of their bore; for example, a 13-inch mortar is one the diameter of whose bore is 13 inches, &c.—The land-mortars are those used in sieges, and of late in battles. They are mounted on beds, and both mortar and bed are transported on block carriages. There is likewise a kind of land-mortars mounted on travelling carriages, invented by count Buckeburg, which may be elevated to any degree; whereas all the English mortars are fixed to an angle of 45°. This custom, however, does not appear to have any foundation in reason. In a siege, shells should never be thrown with an angle of 45 degrees, excepting one case only; that is, when the battery is so far off, that they cannot otherwise reach the works: for when shells are thrown out of the trenches into the works of a fortification, or from the town into the trenches, they should have as little elevation as possible, in order not to bury themselves, but to roll along the ground, whereby they do much more damage, and occasion a much greater consternation among the troops, than if they sunk into the ground. On the contrary, when shells are thrown upon magazines, or any other buildings, the mortars should be elevated as high as possible, that the shells may acquire a greater force in their fall, and consequently do more execution.

There are other kinds of mortars, called *partridge-mortars*, *hand-mortars*, and *firelock-mortars*; which last are also called *bombards*. The partridge-mortar is a common one, surrounded with 13 other little mortars bored round its circumference, in the body of the metal; the middle one is loaded with a shell, and the others with grenades. The vent of the large mortar

being fired, communicates its fire to the rest; so that both the shell and grenades go off at once. Hand-mortars were frequently used before the invention of cohorns. They were fixed at the end of a staff four feet and a half long, the other end being shod with iron to stick in the ground; and while the bombardier with one hand elevated it at pleasure, he fired it with the other. The firelock-mortars, or bombards, are small mortars fixed to the end of a firelock. They are loaded as all common firelocks are; and the grenade, placed in the mortar at the end of the barrel, is discharged by a flint-lock. To prevent the recoil hurting the bombardier, the bombard rests on a kind of halberd made for that purpose.

The chamber in mortars is the place where the powder is lodged. They are of different forms, and made variously by different nations; but the cylindric seems to be preferable to any other form.

The howitz is a kind of mortar mounted on a field-carriage like a gun: it differs from the common mortars in having the trunnions in the middle, whereas those of the mortar are at the end. The construction of howitzes is as various and uncertain as that of mortars, excepting that the chambers are all cylindric. They are distinguished by the diameter of their bore; for instance, a 10-inch howitz is that which has a bore of 10 inches diameter, and so of others. They were much more lately invented than mortars, and indeed are plainly derived from them.

Royals are a kind of small mortars, which carry a shell whose diameter is 5.5 inches. They are mounted on beds in the same way as other mortars.

Fig. 20. represents a mortar; and the names of its parts are as follow.

AB, the whole length of the mortar.

AC, the muzzle.

CD, chase.

DE, reinforce.

EF, breech.

GH, trunnions.

a, vent.

b, dolphins.

c d, vent-alstragal and fillets.

d e, breech-ring and ogee.

f g, reinforce-ring and ogee.

g h, reinforce-alstragal and fillets.

i k, muzzle-alstragal and fillets.

k l, muzzle-ring and ogee.

l m, muzzle mouldings.

n, shoulders.

Interior parts.

o, chamber.

p, bore.

q, mouth.

r, vent.

The mortar-beds are formed of very solid timber, and placed upon very strong wooden frames, fixed in such a manner, that the bed may turn round. The fore-part of these beds is an arc of a circle described from the centre on which the whole turns.

There are several instruments employed in the loading of cannon. The names of these are as follow:

1. The lantern or ladle, which serves to carry the powder

51
Howitzes
and royals.

52
Parts of a
mortar.

53
instru-
ments used
in loading
cannon.

powder into the piece, and which consists of two parts, viz. of a wooden box, appropriated to the caliber of the piece for which it is intended, and of a caliber and a half in length with its vent; and of a piece of copper nailed to the box, at the height of a half caliber.—This lantern must have three calibers and a half in length, and two calibers in breadth, being rounded at the end to load the ordinary pieces.

2. The rammer is a round piece of wood, commonly called a *box*, fastened to a stick 12 foot long, for the pieces from 12 to 33 pounders; and 10 for the 8 and 4 pounders; which serve to drive home the powder and ball to the breach.

3. The sponge is a long staff or rammer, with a piece of sheep or lamb-skin wound about its end, to serve for scouring the cannon when discharged, before it be charged with fresh powder; to prevent any spark of fire from remaining in her, which would endanger the life of him who should load her again.

4. Wad-few consists of two points of iron turned serpent-wise, to extract the wad out of the pieces when one wants to unload them, or the dirt which had chanced to enter into it.

5. The boteveux are sticks two or three feet long, and an inch thick, split at one end, to hold an end of the match twisted round it, to fire the cannon.

6. The priming-iron is a pointed iron rod, to clear the touch-hole of the pieces of powder or dirt; and also to pierce the cartridge, that it may sooner take fire.

7. The primer, which must contain a pound of powder at least, to prime the pieces.

8. The quoin of mire, which are pieces of wood with a notch on the side to put the fingers on, to draw them back or push them forward when the gunner points his piece. They are placed on the sole of the carriage.

9. Laden-plates, which are used to cover the touch-hole, when the piece is charged, lest some dirt should enter it and stop it.

Before charging the piece, it is well sponged, to clean it of all filth and dirt within-side; then the proper weight of gunpowder is put in and rammed down; care being taken that the powder be not bruised in ramming, which weakens its effect; it is then run over by a little quantity of paper, hay, or the like; and lastly, the ball is thrown in.

To point, level, or direct the piece, so as to play against any certain point, is done by the help of a quadrant with a plummet: which quadrant consists of two branches made of brass or wood; one about a foot long, eight lines broad, and one line in thickness; the other four inches long, and the same thickness and breadth as the former. Between these branches is a quadrant, divided into 90 degrees, beginning from the shorter branch, and furnished with thread and plummet.

The longest branch of this instrument is placed in the cannon's mouth, and elevated or lowered till the thread cuts the degree necessary to hit the proposed object. Which done, the cannon is primed, and then set fire to. The method by the sector however, proposed by Dr Lind, is certainly in all cases to be preferred.

A 24 pounder may very well fire 90 or 100 shots, every day in summer; and 60 or 75 in winter. In case of necessity, it may fire more. And some French of-

ficers of artillery assure, that they have caused such a piece to fire every day 150 shots in a siege.—A 16 and a 12 pounder fire a little more, because they are easier served. There have even been some occasions, where 200 shots have been fired from these pieces in the space of nine hours, and 138 in the space of five. In quick firing, tubes are made use of. They are made of tin, and their diameter is two tenths of an inch, being just sufficient to enter into the vent of the piece. They are about six inches long, with a cap above, and cut slanting below, in the form of a pen; the point is strengthened with some folder, that it may pierce the cartridge without bending. Through this tube is drawn a quick-match, the cap being fitted with mealed powder moistened with spirits of wine. To prevent the mealed powder from falling out by carriage, a cap of paper or flannel steeped in spirits of wine is tied over it. To range pieces in a battery, care must be taken to recognise well the ground where it is to be placed, and the avenues to it. The pieces must be armed, each with two lanterns or ladders, a rammer, a sponge, and two priming-irons. The battery must also be provided with carriages, and other implements, necessary to remount the pieces which the enemy should chance to dismount.

To serve expeditiously and safely a piece in a battery, it is necessary to have to each a sack of leather, large enough to contain about 20 pounds of powder to charge the lanterns or ladders, without carrying them to the magazine; and to avoid thereby making those trains of powder in bringing back the lantern from the magazine, and the accidents which frequently happen thereby.

A battery of three pieces must have 30 gabions, because six are employed on each of the two sides or epaulements, which make 12, and nine for each of the two merlons.

There ought to be two gunners and six soldiers to each piece, and four officers of artillery.

The gunner, posted on the right of the piece, must take care to have always a pouch-full of powder, and two priming irons; his office is to prime the piece, and load it with powder. The gunner on the left fetches the powder from the little magazine, and fills the lantern or ladle which his comrade holds; after which, he takes care that the match be very well lighted, and ready to set fire to the piece at the first command of the officer.

There are three soldiers on the right, and three on the left of the piece. The two first take care to ram and sponge the piece, each on his side. The rammer and sponge are placed on the left, and the lantern or ladle on the right. After having rammed well the wad put over the powder, and that put over the bullet, they then take each a handspike, which they pass between the foremost spokes of the wheel, the ends whereof will pass under the head of the carriage, to make the wheel turn round, leaning on the other end of the handspike, towards the embrasure.

It is the office of the second soldier on the right, to provide wad, and to put it into the piece, as well over the powder as over the bullet; and that of his comrade on the left, to provide 50 bullets, and, every time the piece is to be charged, to fetch one of them and put it into the piece after the powder has been rammed.

med. Then they both take each an handspike, which they pass under the hind part of the wheel, to push it in battery.

The officer of artillery must take care to have the piece diligently served.

In the night he must employ the gunners and soldiers, who shall relieve those who have served 24 hours to repair the embrasures.

If there be no water near the battery, care must be taken to have a cask filled with it, in which to dip the sponges and cool the pieces every 10 or 12 rounds.

The carriage for a mortar of 12 inches of diameter must be 6 foot long, the flasks 12 inches long and 10 thick. The trunnions are placed in the middle of the carriage.

The carriage of an 18 inch mortar must be 4 foot long; and the flasks 11 inches high, and 6 thick.

To mount the mortars of new invention, they use carriages of cast iron.

In Germany, to mount mortars from 8 to 9 inches, and carry them into the field, and execute them horizontally as a piece of cannon, they make use of a piece of wood 8 feet 2 inches long, with a hole in the middle to lodge the body of the mortar and its trunnions as far as their half diameter, and mounted on two wheels four feet high, to which they join a vantrain proportioned to it, and made like those which serve to the carriages of cannons.

Having mounted the mortar on its carriage, the next thing is to calibrate the bomb, by means of a great caliber, the two branches whereof embrace the whole circumference of the bomb: these two branches are brought on a rule where the different calibers are marked, among which that of the bomb is found.

If no defect be found in the bomb, its cavity is filled, by means of a funnel, with whole gunpowder; a little space or liberty is left, that when a fusee or wooden tube, of the figure of a truncated cone, is driven thro' the aperture, (with a wooden mallet, not an iron one, for fear of accident), and fastened with a cement made of quick-lime, ashes, brick-dust, and steel-slings worked together in a glutinous water, or of four parts of pitch, two of colophony, one of turpentine, and one of wax, the powder may not be bruised. This tube is filled with a combustible matter, made of two ounces of nitre, one of sulphur, and three or more of gunpowder dust well rammed. See FUZE.

This fusee set on fire, burns slowly till it reaches the gunpowder; which goes off at once, bursting the shell to pieces with incredible violence. Special care, however, must be taken, that the fusee be so proportioned, as that the gunpowder do not take fire ere the shell arrives at the destined place; to prevent which, the fusee is frequently wound round with a wet clammy thread.

Batteries consist,—1. Of an epaulment to shelter the mortars from the fire of the enemy. 2. Of platforms on which the mortars are placed. 3. Of small magazines of powder. 4. Of a boyau which leads to the great magazine. 5. Of ways which lead from the battery to the magazine of bombs. 6. Of a great ditch before the epaulment. 7. Of a berm or retraite.

The platforms for mortars of 12 inches must have 9 feet in length, and 6 in breadth.—The lambourds for

common mortars must be four inches thick; those of a concave chamber of 8 lb. of powder, 5 inches; those of 12 lb. 6 inches; those of 18 lb. 7 inches, or thereabouts. Their lengths at discretion, provided there be enough to make the platforms 9 feet long.—The forepart of the platform will be situated at two foot distance from the epaulment of the battery.—The bombardiers, to shelter themselves in their battery, and not be seen from the town besieged, raise an epaulment of 7 foot or more high, which epaulment has no embrasures.

To serve expeditiously a mortar in battery, there are required,—five strong handspikes; a dame or rammer, of the caliber of the conic chamber, to ram the wad and the earth; a wooden knife a foot long, to place the earth round the bomb; an iron scraper two feet long, one end whereof must be four inches broad and round-wise, to clean the bore and the chamber of the mortar, and the other end made in form of a spoon to clean the little chamber; a kind of brancard to carry the bomb, a shovel, and pick-ax.

The officer who is to mind the service of the mortar, must have a quadrant to give the degrees of elevation.

Five bombardiers, or others, are employed in that service; the first must take care to fetch the powder to charge the chamber of the mortar, putting his priming-iron in the touch-hole before he charges the chamber; and never going to fetch the powder before he has asked his officer at what quantity of powder he designs to charge, because more or less powder is wanted according to the distance where it is fired; the same will take care to ram the wad and earth, which another soldier puts in the chamber.

The soldier on the right will put again two shovels full of earth in the bottom of the bore, which should be likewise very well rammed down.

This done, the rammer or dame is returned into its place, against the epaulment on the right of the mortar: he takes an handspike in the same place to post himself behind the carriage of the mortar, in order to help to push it into battery: having laid down his handspike, he takes out his priming-iron, and primes the touch-hole with fine powder.

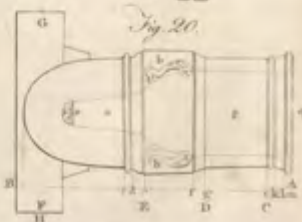
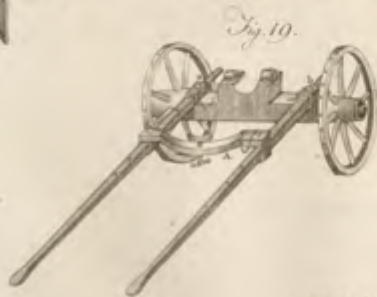
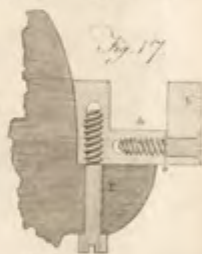
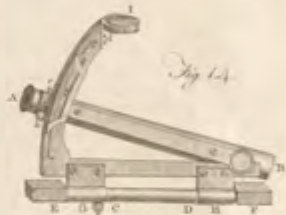
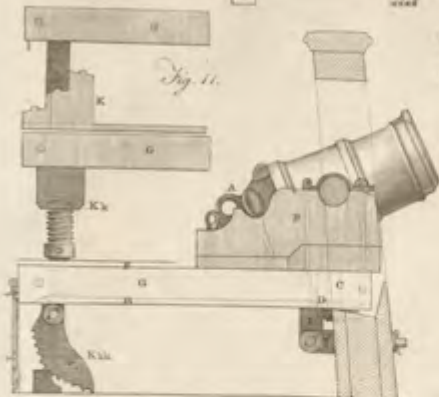
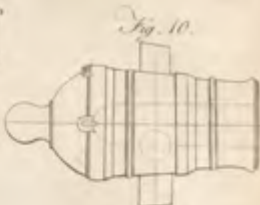
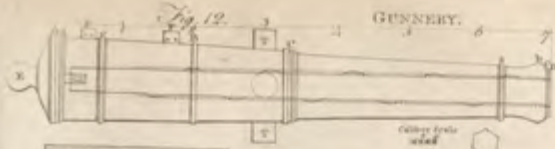
The second soldier on the right and left will have by that time brought the bomb ready loaded, which must be received into the mortar by the first soldier, and placed very strait in the bore or chase of the mortar.

The first, on the right, will furnish him with earth to put round the bomb, which he must take care to ram close with the knife given him by the second on the left.

This done, each shall take a handspike, which the two first, on the right and left, shall put under the pegs of retreat of the forepart, and the two behind under those of the hind-part; and they together push the mortar in battery.

Afterwards the officer points or directs the mortar.

During that time, the first soldier takes care to prime the touch-hole of the mortar, without ramming the powder; and the last on the right, must have the match ready to set fire to the fusee of the bomb on the right, while the first is ready with his on the left,



ABell Sculp.



The foremost soldiers will have their handspikes ready to raise the mortar upright, as soon as it has discharged; while the hindmost on the left shall, with the scraper, clean the bore and chamber of the mortar.

The magazine of powder for the service of the battery, shall be situated 15 or 20 paces behind, and covered with boards, and earth over it.—The loaded bombs are on the side of the said magazine, at five or six paces distance.

The officer who commands the service of the mortar, must take care to discover, as much as possible, with the eye, the distance of the place where he intends to throw his bomb, giving the mortar the degree of elevation, according to the judgment he has formed of the distance. Having thrown the first bomb, he must diminish or increase the degrees of elevation, according to the place upon which it shall fall. Several make use of tables to discover the different distances according to the differences of the elevations of the mortar, especially the degrees of the quadrant from 1 to 45; but these, from the principles already laid down, must be fallacious.

The petard is the next piece of artillery which deserves our attention, and is a kind of engine of metal, somewhat in shape of a high-crowned hat, serving to break down gates, barricades, draw-bridges, or the like works, which are intended to be surprized. It is very short, narrow at the breech, and wide at the muzzle, made of copper mixed with a little brass, or of lead with tin.

The petards are not always of the same height and bigness; they are commonly 10 inches high, 7 inches of diameter at top, and 10 inches at bottom. They weigh commonly 40, 45, and 50 pounds.

The madrier, on which the petard is placed, and where it is tied with iron circles, is of two feet for its greatest width, and of 18 inches on the sides, and no thicker than a common madrier. Under the madrier are two iron-bars passed crosswise, with a hook, which serves to fix the petard.

To charge a petard 15 inches high, and 6 or 7 inches of caliber or diameter at the bore, the inside must be first very well cleaned and heated, so that the hand may bear the heat; then take the best powder that may be found, throw over it some spirit of wine, and expose it to the sun, or put it in a frying-pan; and when it is well dried, 5 or 6 lb. of this powder is put into the petard, which reaches within three fingers of the mouth: the vacancies are filled with tow, and stopped with a wooden tampon; the mouth being strongly bound up with cloth tied very tight with ropes; then it is fixed on the madrier, that has a cavity cut in it to receive the mouth of the petard, and fastened down with ropes.

Some, instead of gun-powder for the charge, use one of the following composition, viz. gun-powder seven pounds, mercury sublimate one ounce, camphor eight ounces; or gun-powder six pounds, mercury sublimate three ounces, and sulphur three; or gun-powder six, beaten glass $\frac{1}{2}$ an ounce, and camphor $\frac{1}{2}$.

Before any of these pieces are appropriated for service, it is necessary to have each undergo a particular trial of its soundness, which is called a *proof*, to be made by or before one authorized for the purpose, called the *proof-master*.

To make a proof of the piece, a proper place is chosen, which is to be terminated by a mount of earth very thick to receive the bullets fired against it, that none of them may run through it. The piece is laid on the ground, supported only in the middle by a block of wood. It is fired three times: the first with powder of the weight of the bullet, and the two others with $\frac{1}{2}$ of the weight; after which a little more powder is put in to finge the piece; and after this, water, which is imprefsed with a sponge, putting the finger on the touch-hole, to discover if there be any cracks; which done, they are examined with the eat, which is a piece of iron with three grasps, disposed in the form of a triangle, and of the caliber of the piece; then it is visited with a wax-candle, but it is of very little service in the small pieces, because if they be a little long, the smoke extinguishes it immediately. See Plate xlii.

Besides the large pieces already mentioned, invented for the destruction of mankind, there are others called *small guns*, viz. muskets of ramparts, common muskets, fusils, carabines, musketoons, and pistols.

A musket, or musquet, is a fire-arm borne on the shoulder, and used in war, formerly fired by the application of a lighted match, but at present with a flint and lock. The common musket is of the caliber of 20 leaden balls to the pound, and receives balls from 22 to 24: its length is fixed to 3 feet 8 inches from the muzzle to the touch-pan.

A fusil, or fire-lock, has the same length and caliber; and serves at present instead of a musket.

A carabine is a small sort of fire-arm, shorter than a fusil, and carrying a ball of 24 in the pound, borne by the light-horse, hanging at a belt over the left shoulder. This piece is a kind of medium between the pistol and the musket; and bears a near affinity to the arquebuss, only that its bore is smaller. It was formerly made with a match-lock, but of late only with a flint-lock.

The musketoon is of the same length of the carabine, the barrel polished, and clean within. It carries five ounces of iron, or seven and a half of lead, with an equal quantity of powder.

The barrel of a pistol is generally 14 inches long.

G U N

GUN-POWDER, a composition of saltpetre, fulphur, and charcoal, mixed together, and usually granulated; which easily takes fire, and, when fired, rarifies, or expands with great vehemence, by means of its elastic force.

It is to this powder we owe all the action and effect

G U N

of guns, ordnance, &c. so that the modern military art, fortification, &c. in a great measure depend thereon.

Invention of GUN-POWDER. See GUN.

Method of making GUN-POWDER. Dr Shaw's receipt for this purpose is as follows: Take four ounces of

57
Of the petard.

58
Of small arms.

Gun-
powder.

of refined saltpetre, an ounce of brimstone, and six drams of small-coal: reduce these to a fine powder, and continue beating them for some time in a stone mortar, with a wooden pestle, wetting the mixture between whiles with water, so as to form the whole into an uniform paste, which is reduced to grains, by passing it through a wire-sieve fit for the purpose; and in this form being carefully dried, it becomes the common gun-powder.

For greater quantities, mills are usually provided; by means of which more work may be performed in one day, than a man can do in a hundred.

The nitre or saltpetre is refined thus: Dissolve four pounds of rough nitre as it comes to us from the Indies, by boiling it in as much water as will commodiously suffice for that purpose: then let it shoot for two or three days in a covered vessel of earth, with sticks laid across for the crystals to adhere to. These crystals being taken out, are drained and dried in the open air.

In order to reduce this salt to powder, they dissolve a large quantity of it in as small a proportion of water as possible; then keep it constantly stirring over the fire, till the water exhales, and a white dry powder is left behind.

In order to purify the brimstone employed, they dissolve it with a very gentle heat; then scum and pass it through a double strainer. If the brimstone should happen to take fire in the melting, they have an iron cover that fits on close to the melting vessel, and damps the flame. The brimstone is judged to be sufficiently refined if it melts, without yielding any fetid odour, between two hot iron-plates, into a kind of red substance.

The coal for the making of gun-powder is either that of willow, or hazel, well charred in the usual manner, and reduced to powder. And thus the ingredients are prepared for making this commodity: but as these ingredients require to be intimately mixed, and as there would be danger of their firing if beat in a dry form, the method is to keep them continually moist, either with water, urine, or a solution of sal ammoniac: they continue thus stamping them together for twenty-four hours, after which the mass is fit for corning and drying in the sun, or otherwise, so as sedulously to prevent its firing.

Different kinds of Gun-powder. The three ingredients of gun-powder are mixed in various proportions according as the powder is intended for muskets, great guns, or mortars: though these proportions seem not to be perfectly adjusted or settled by competent experience.

Semenowitz, for mortars, directs an hundred pounds of saltpetre, twenty-five of sulphur, and as many of charcoal; for great guns, an hundred pounds of saltpetre, fifteen pound of sulphur, and eighteen pound of charcoal; for muskets and pistols, an hundred pound of saltpetre, eight pound of sulphur, and ten pound of charcoal. Miethuis extols the proportion of one pound of saltpetre to three ounces of charcoal, and two or two-and-a-quarter of sulphur; than which, he affirms, no gun-powder can possibly be stronger. He adds, that the usual practice of making the gun-powder weaker for mortars than guns, is without any foundation, and renders the expence needlessly much

Gun-
powder.

greater: for whereas to load a large mortar, twenty-four pound of common powder is required, and consequently, to load it ten times, two hundred and forty pound, he shews, by calculation, that the same effect would be had by one hundred and fifty pound of the strong powder.

To increase the strength of powder, Dr Shaw thinks it proper to make the grains considerably large, and to have it well sifted from the small dust. We see that gun-powder, reduced to dust, has little explosive force; but when the grains are large, the flame of one grain has a ready passage to another, so that the whole parcel may thus take fire nearly at the same time, otherwise much force may be lost, or many of the grains go away as shot unfired.

It should also seem that there are other ways of increasing the strength of powder, particularly by the mixture of salt of tartar; but perhaps, adds the last-mentioned author, it were improper to divulge any thing of this kind, as gun-powder seems already sufficiently destructive.

Method of Trying and Examining Gun-powder. There are two general methods of examining gun-powder; one with regard to its purity, the other with regard to its strength. Its purity is known by laying two or three little heaps near each other upon white paper, and firing one of them. For if this takes fire readily, and the smoke rises upright, without leaving any dross or sculent matter behind, and without burning the paper, or firing the other heaps, it is esteemed a sign that the sulphur and nitre were well purified, that the coal was good, and that the three ingredients were thoroughly incorporated together: but if the other heaps also take fire at the same time, it is presumed, that either common salt was mixed with the nitre, or that the coal was not well ground, or the whole mass not well beat, and mixed together; and if either the nitre or sulphur be not well purified, the paper will be black or spotted.

In order to try the strength of gun-powder, there are two kinds of instruments in use; but neither of them appear so exact as the common method of trying with what velocity a certain weight of powder will throw a ball from a musket.

There has been much talk of a white powder, which, if it answered the character given it, might be a dangerous composition; for they pretend that this white powder will throw a ball as far as the black, yet without making a report: but none of the white powder we have seen, says Dr Shaw, answers to this character; being, as we apprehend, commonly made either with touchwood or camphor, instead of coal.

Under the article GUNNERY, the physical cause of the explosion of powder, and the force wherewith it expands, have been so fully considered, that it would be superfluous to add any thing here concerning them. Only we may observe, that though it is commonly made use of for military purposes only in small quantities, and confined in certain vessels; yet when large quantities are fired at once, even when unconfined, in the open air, it is capable of producing terrible destruction. The accounts of damage done by the blowing up of magazines, powder-mills, &c. are too numerous and well-known to be here taken notice of. The following is a relation of what even a moderate quantity of

of powder will accomplish, when fired in the open air. "The king of Navarre took Monfegur. Captain Milon inclosed 500 pounds of powder in a bag, which he found means to introduce, by a drain from the town, into the ditch between two principal gates; the end of the leader was hid in the grafs. Every thing being ready to play off this machine, the king gave us leave to go and fee its effects; which was furprising. For one of the gates was thrown into the middle of the town, and the other into the field fifty paces from the wall: all the vaults were destroyed, and a paffage was made in the wall for three men to enter abreast, by which the town was taken."—For further accounts of the force of large quantities of powder, fee the article MINES.

To recover damaged GUN-POWDER. The method of the powder-merchants is, to put part of the powder on a fail-cloth, to which they add an equal weight of what is really good; and with a fhovel mingle it well together, dry it in the fun, and barrel it up, keeping it in a dry and proper place. Others again, if it be very bad, restore it by moistening it with vinegar, water, urine, or brandy: then they beat it fine, scarce it, and to every pound of powder add an ounce, an ounce and a half, or two ounces, according as it is decayed, of melted falt-petre. Afterwards, these ingredients are to be moistened and mixed well, so that nothing can be discerned in the composition, which may be known by cutting the mafs; and then they granulate it as aforefaid. In case the powder be in a manner quite spoiled, the only way is to extract the falt-petre with water, according to the usual manner, by boiling, filtrating, evaporating, and crystallizing; and then with fresh sulphur and charcoal to make it up anew again.

In regard to the medical virtues of gun-powder, Boerhaave informs us, that the fume of it affords a very healthy fume in the height of the plague, because the explosive acid vapour of nitre and sulphur corrects the air; and that the same vapour, if received in a small clofe pent-up place, kills insects.

It is enacted by 5 and 11 of Geo. I. and 5 Geo. II. c. 20. that gun-powder be carried to any place in a covered carriage; the barrels being clofe-jointed; or in cafes and bags of leather, &c. And persons keeping more than 200 pounds weight of gun-powder at one time, within the cities of London and Westminster, or the suburbs, &c. are liable to forfeitures if it be not removed; and justices of peace may issue warrants to search for, seize, and remove the same.

GUN-Shot Wounds. See SURGERY.

GUNTER (Edmund), an excellent English mathematician and astronomer, was born in Hertfordshire in 1581, and studied at Westminster school; from whence he removed to Oxford, where he took the degree of master of arts in 1606, and afterwards entered into holy orders. In 1615, he took the degree of bachelor of divinity: but being pecuniary eminent for his knowledge in the mathematics, he had two years before been chosen professor of astronomy in Gresham college, London; where he distinguished himself by his lectures and writings. He invented a small portable quadrant; and also the famous line of proportions, which, after the inventor, is called *Gunter's Scale*. He likewise published *Canon Triangulorum*;

VOL. V.

and a work entitled, *Of the sector, cross-staff, and other instruments*. This last was published, with an English translation of his *Canon Triangulorum*, in 4to, by Samuel Foster, professor of Gresham college. Mr Gunter died at that college in 1626.

GUNTER'S-Line, a logarithmic line, usually graduated upon scales, sectors, &c.

It is also called the *line of lines*, and *line of numbers*; being only the logarithms graduated upon a ruler, which therefore serves to solve problems instrumentally in the same manner as logarithms do arithmetically. It is usually divided into an hundred parts, every tenth whereof is numbered, beginning with 1, and ending with 10: so that, if the first great division, marked 1, stand for one tenth of any integer, the next division, marked 2, will stand for two tenths; 3, three tenths, and so on; and the intermediate divisions will, in like manner, represent 100th-parts of the same integer. If each of the great divisions represent 10 integers, then will the lesser divisions stand for integers; and if the greater divisions be supposed each 100, the subdivisions will be each 10.

Use of GUNTER'S-Line. 1. *To find the product of two numbers.* From 1 extend the compasses to the multiplier; and the same extent, applied the same way from the multiplicand, will reach to the product. Thus if the product of 4 and 8 be required, extend the compasses from 1 to 4, and that extent laid from 8 the same way will reach to 32, their product. 2. *To divide one number by another.* The extent from the divisor to unity, will reach from the dividend to the quotient: thus, to divide 36 by 4, extend the compasses from 4 to 1, and the same extent will reach from 36 to 9, the quotient sought. 3. *To three given numbers, to find a fourth proportional.* Suppose the numbers 6, 8, 9: extend the compasses from 6 to 8; and this extent, laid from 9 the same way, will reach to 12, the fourth proportional required. 4. *To find a mean proportional between any two given numbers.* Suppose 8 and 32: extend the compasses from 8, in the left-hand part of the line, to 32 in the right; then bisecting this distance, its half will reach from 8 forward, or from 32 backward, to 16, the mean proportional sought. 5. *To extract the square-root of any number.* Suppose 25; bisect the distance between 1 on the scale and the point representing 25: then the half of this distance, set off from 1, will give the point representing the root 5. In the same manner, the cube root, or that of any higher power, may be found by dividing the distance on the line between 1 and the given number, into as many equal parts as the index of the power expresses; then one of those parts, set from 1, will find the point representing the root required.

GUNTER'S Quadrant, one made of wood, brass, &c. containing a kind of stereographic projection of the sphere, on the plane of the equinoctial; the eye being supposed placed in one of the poles.

GUNTER'S Scale, called by navigators simply the *gunter*, is a large plain scale, generally two foot long, and about an inch and a half broad, with artificial lines delineated on it, of great use in solving questions in trigonometry, navigation, &c.

GUN-WALE, or GUNNEL, is the uppermost wale of a ship, or that piece of timber which reaches on ei-

ther side from the quarter-deck to the forecable, being the uppermoft bend which finishes the upper works of the hull, in that part in which are put the stanchions which fupport the wafe-trees.

GURK, an epifcopal town of Carinthia in Germany, feated on the river Gurk, in E. Long. 14. 15. N. Lat. 47. 10.

GURNARD, in ichthyology. See TRIGLA.

GUST, a sudden and violent fquall of wind, buifing from the hills upon the fea, fo as to endanger the fhipping near the fhore. Thiefe are peculiar to fome coafts, as thofe of South Barbary and Guinea.

GUSTAVUS I. king of Sweden, fon of Eric de Vafa duke of Gripsholm. Chriftian II. king of Denmark having made himfelf mafter of the kingdom of Sweden, confined Gultavus at Copenhagen; but he making his efcape, wandered a long time in the forefts, till the cruelties of the tyrant having occafioned a revolution, he was firft declared governor of Sweden, and in 1513 elected king. This prince introduced Lutheranism into his dominions, which in a little time fpread itfelf all over the kingdom. He died in 1560; having made his kingdom hereditary, which was before elective. See SWEDEN.

GUSTAVUS *Adolphus*, furnamed *the Great*, king of Sweden, was born at Stockholm in 1594, and fucceeded his father Charles in 1611. He efpoufed the caufe of the Proteftants in Germany, who were oppreffed and almoft entirely ruined by the emperor Ferdinand. He was a great warrior, and gained many victories, of which an account is given under the article SWEDEN. He was at laft killed in the battle of Lutzen, where his troops got the victory, and defeated two of the emperor's armies.

GUTTA *ROSACEA*, in medicine, called alfo fimplly *Rofacea*, from the little red dots or fiery tubercles difperfed about the face and nofe. See (the *Index* fubjoined to) MEDICINE.

GUTTA *Serena*, a difeafe in which the patient, without any apparent fault in the eye, is deprived of fight. See (the *Index* fubjoined to) MEDICINE.

GUTTA, in architecture, are ornaments in the form of little cones ufed in the Doric cornice, or on the architrave underneath the triglyphs, representing a fort of drops or bells.

GUTTURAL, a term applied to letters or founds pronounced or formed as it were in the throat.

GUTTY, in heraldry, a term ufed when anything is charged or fprinkled with drops. In blazoning, the colour of the drops is to be named; as gutty of fable, of gules, &c.

GUY (Thomas), an eminent bookfeller, founder of the hofpital for fick and lame in Southwark bearing his name, was the fon of Thomas Guy lighterman and coal-dealer in Horfleydown, Southwark. He was put apprentice, in 1660, to a bookfeller in the porch of Mercer's chapel; and fet up trade with a flock of about 200 l. in the houfe that forms the angle between Cornhill and Lombard-ftreet. The Englifh Bibles being at that time very badly printed, Mr Guy engaged with others in a fcheme for printing them in Holland and importing them; but this being put a flop to, he contracted with the univerfity of Oxford for their privilege of printing them, and carried on a great bible-trade for many years to a confiderable advantage. Thus he

began to accumulate money, and his gains refted in his hands; for being a fingle man, and very penurious, his expences could not be great when it was his cuftom to dine on his fhop-counter with no other table-covering than an old newspaper: he was moreover as little fcrupulous about the ftyle of his apparel. The bulk of his fortune, however, was acquired by purchafing feamens tickets during queen Anne's wars, and by South-Sea-ftock in the memorable year 1720. To thefe what great events fpring from trivial caufes, it may be obferved, that the public owe the dedication of the greateft part of his immense fortune to charitable purpofes, to the indifcreet officioufnefs of his maid-fervant in interfering with the mending of the pavement before the door. Guy had agreed to marry her; and, preparatory to his nuptials, had ordered the pavement before his door, which was in a neglected ftate, to be mended, as far as to a particular ftone which he pointed out. The maid, while her mafter was out, innocently looking on the pavours at work, faw a broken place that they had not repaired, and mentioned it to them: but they told her that Mr Guy had directed them not to go fo far. Well, fays fhe, do you mend it, tell him I bade you, and I know he will not be angry. It happened, however, that the poor girl prefumed too much on her influence over her careful lover, with whom a few extraordinary fhillings expence turned the fcale totally againft her: the men obeyed, Guy was enraged to find his orders exceeded, his matrimonial fcheme was renounced, and fo he built hofpitals in his old age. In the year 1707 he built and furnifhed three wards on the north-fide of the outer court of St Thomas's Hofpital in Southwark, and gave 100 l. to it annually for eleven years preceding the erection of his own hofpital: and, fome time before his death, erected the ftately iron gate, with the large houfes on each fide, at the expence of about 3000 l. He was 76 years of age when he formed the defign of building the hofpital contiguous to that of St Thomas's, which bears his name, and lived to fee it roofed in; dying in the year 1724. The charge of erecting this vaft pile amounted to 18,793 l. and he left 219,499 l. to endow it; a much larger fum than had ever been dedicated to charitable ufes in this kingdom by any one man. He erected an alms-houfe with a library at Tanworth in Staffordfhire (the place of his mother's nativity, and for which he was reprefentative in parliament) for 14 poor men and women; and for their penfions, as well as for the putting out poor children apprentices, bequeathed 125 l. a year. Laftly, he bequeathed 1000 l. to every one who could prove themfelves in any degree related to him.

Guv, a rope ufed to keep fteady any weighty body whilft it is hoifting or lowering, particularly when the fhip is shaken by a tempeftuous fea.

Guv is likewise a large flack rope, extending from the head of the main-maft to the head of the fore-maft, and having two or three large blocks fattened to the middle of it. This is chiefly employed to fustain the tackle ufed to hoift in and out the cargo of a merchant fhip, and is accordingly removed from the maft-head as foon as the vefel is laden or delivered.

GUYON (Johanna Mary Bouriers de la Motie), a French lady, memorable for her writings, and for her fufferings in the caufe of Quietifm, was defcended from

Gyarus
||
Gymna-
sium.

a noble family, and born at Montargis in 1648. She gave some extraordinary symptoms of illumination from her earliest infancy, and tried to take the veil before she was of age to dispose of herself; but her parents obliged her to marry a gentleman to whom they had promised her. She was a widow at the age of 28; when distinguishing herself in, and making many converts to, the way of contemplation and prayer, known by the name of *quietism*, complaints were made of her spiritualism; and she confined by order of the king, and severely examined for eight months. She was discharged; but was afterwards involved in the persecution of the archbishop of Cambray, and thrown into the Bastille, where she underwent many examinations: but nothing being made out against her, she once more obtained her liberty, and lived private to her death in 1717. She spent her latter years in mystical reveries; covering her tables, ceilings, and every thing that would receive them, with the fallies of a visionary imagination. Her pious verses were collected after her death, in 5 vols, entitled *Cantiques spirituels, ou d'Emblèmes sur l'Amour Divin*. Her publications were, *Le moyen court et très facile de faire Oraisons*; and *Le Cantique des Cantiques de Salomon interprété, selon le sens mystique*; which were condemned by the archbishop of Paris.

GYARUS, (anc. geog.), one of the Cyclades, 12 miles in compass, lying to the east of Delos. It was a desert island, and allotted for a place of banishment by the Romans.

GYBING, the act of shifting any boom-fail from one side of the mast to the other.

In order to understand this operation more clearly, it is necessary to remark, that by a boom-fail is meant any fail whose bottom is extended by a boom, the fore-end of which is hooked to its respective mast; so as to swing occasionally on either side of the vessel, describing an arch, of which the mast will be the centre. As the wind or the course changes, it also becomes frequently necessary to change the position of the boom, together with its fail, which is accordingly shifted to the other side of the vessel as a door turns upon its hinges. The boom is pushed out by the effort of the wind upon the fail, and is restrained in a proper situation by a strong tackle communicating with the vessels stern, and called the *sheet*. It is also confined on the fore-part by another tackle, called the *guy*.

GYMNASIARCH, in antiquity, the director of the gymnasium. He had two deputies under him; the one called *xystarch*, who presided over the athletes, and had the oversight of wrestling; the other was *gymnastes*, who had the direction of all other exercises.

GYMNASIUM, in Grecian antiquity, a place fitted for performing exercises.—The word is Greek, formed of γυμνός, “naked;” by reason they anciently put off their clothes, to practise with the more freedom.

Gymnasia, according to Potter, were first used at Lacedæmon, but were afterwards very common in all parts of Greece; and imitated, very much augmented, and improved, at Rome. They were not single edifices, but a knot of buildings united, being sufficiently capacious to hold many thousands of people at once; and having room enough for philosophers, rhetoricians, and the professors of all other sciences to read their

lectures,—and wrestlers, dancers, and all others who had a mind, to exercise,—at the same time, without the least disturbance or interruption. They consisted of a great many parts; the chief of which were the porticoes, cleothesium, palastra, conislorium, &c.

Athens had several gymnasia, of which the lyceum, academia, and cynosarges, were those of most note.

The lyceum was seated on the banks of the river Ilissus; and received its name from Apollo, to whom it was dedicated. This was the place where Aristotle taught philosophy, walking there every day till the hour of anointing: whence he and his followers were named *Peripatetics*.

The academy was part of the Ceramicus without the city, where Plato lectured.

The cynosarges was allotted for the populace.

GYMNASTICS, the art of performing the several bodily exercises, as wrestling, running, fencing, dancing, &c.

That part of medicine which regulates the exercises of the body, whether for preserving or relieving health, is also termed *gymnastice*.

GYMNOPYRIS, in natural history, a name given by Dr Hill to the pyrite of a simple internal structure, and not covered with a crust. See PYRITES.

Of these there are only two species. 1. A green variously shaped kind. 2. A botryoid kind.

The first species is the most common of all the pyrites, and appears under a great diversity of shapes. It is very hard and heavy, very readily gives fire with steel, but will not at all ferment with aquafortis. The second species is very elegant and beautiful, and its usual colour is a very agreeable pale green; but what most distinguishes it from all other pyrites is, that its surface is always beautifully elevated into tubercles of various sizes, resembling a cluster of grapes.

GYMNOSOPHISTS, a sect of philosophers who clothed themselves no farther than modesty required. There were some of these sages in Africa; but the most celebrated clan of them was in India. The African gymnosophists dwelt upon a mountain in Ethiopia, near the Nile, without the accommodation either of house or cell. They did not form themselves into societies like those of India; but each had his private recess, where he studied, and performed his devotions by himself. If any person had killed another by chance, he applied to these sages for absolution, and submitted to whatever penances they enjoined. They observed an extraordinary frugality, and lived only upon the fruits of the earth. Lucan ascribes to these gymnosophists several new discoveries in astronomy.

As to the Indian gymnosophists, they dwelt in the woods, where they lived upon the wild products of the earth, and never drank wine nor married. Some of them practised physic, and travelled from one place to another; these were particularly famous for their remedies against barrenness. Some of them, likewise, pretended to practise magic, and to foretell future events.

In general, the gymnosophists were wise and learned men: their maxims and discourses, recorded by historians, do not in the least favour of a barbarous education; but are plainly the result of great sense and deep thought. They kept up the dignity of their

Gymnastics
||
Gymno-
sophists.

Gymno-
spermia,
Gymnotus.

character to so high a degree, that it was never their custom to wait upon anybody, not even upon princes themselves; for which reason Alexander, who would not condescend to visit them in person, sent some of his courtiers to them in order to satisfy his curiosity. Their way of educating their disciples is very remarkable: every day, at dinner, they examined them how they had spent the morning; and every one was obliged to shew, that he had discharged some good office, practised some virtue, or improved in some part of learning: if nothing of this appeared, he was sent back without his dinner. They held a transmigration of souls; and it is probable that Pythagoras borrowed his doctrine from them.

GYMNOSPERMIA, in botany, from *γυμνός*, *naked*, and *σπέρμα*, *seed*; the first order in Linnæus's class of didynamia. It comprehends those plants of that class which have naked seeds. The seeds are constantly four in number, except in one genus, viz. *phryma*, which is monospermous. See BOTANY, p. 1292.

GYMNOTUS, in ichthyology, a genus of fishes belonging to the order of apodes. They have two tentacula at the upper lip; the eyes are covered with the common skin; there are five rays in the membrane of the gills; the body is compressed, and carinated on the belly with a fin. There are five species; the most remarkable of which is the electricus. This species is peculiar to Surinam; and is found in the rocky parts of the river, at a great distance from the sea. The most accurate description we have of this fish is in the Phil. Transf. for 1775, where Alex. Garden, M. D. gives an account of three of them brought to Charleston in South-Carolina. The largest was about three feet eight inches in length, and might have been from 10 to 14 inches in circumference about the thickest part of its body. The head was large, broad, flat, and smooth; impressed here and there with holes, as if perforated with a blunt needle, especially towards the sides, where they were more regularly ranged in a line on each side. There were two nostrils on each side; the first large, tubular, and elevated above the surface; the others small, and level with the skin. The eyes were small, flattish, and of a bluish colour, placed about three quarters of an inch behind the nostrils. The whole body, from about four inches below the head, was clearly distinguished into four longitudinal parts or divisions. The upper part or back was of a dark colour, and separated from the other parts on each side by the lateral lines. These lines took their rise at the base of the head, just above the pectoral fins, and run down the sides, gradually converging as the fish grew smaller to the tail. The second division was of a lighter and clearer colour than the first, inclining to blue. It seemed to swell out on each side; but towards the under part it is again contracted and sharpened into the third part or *carina*. This part is easily distinguished from the other two by its thinness, its apparent laxness, and by the reticulated skin of a more grey and light colour, with which it is covered. The *carina* begins about six or seven inches below the base of the head; and, gradually deepening or widening as it goes along, reaches down to the tail, where it is thinnest. The fourth part is a long, deep, soft and wavy fin, which takes its rise about three or

four inches at most below the head; and thus runs down the sharp edge of the *carina* to the extremity of the tail. The situation of the anus was very singular; being an inch more forward than the pectoral fins. Externally it seemed to be a pretty large *rima*; but the formed excrements were only the size of a quill of a common dunghill-fowl. There were two pectoral fins situated just behind the head, scarcely an inch in length; of a very thin, delicate consistence, and orbicular shape. They seemed to be chiefly useful in supporting and raising the head of the fish when he came up to breathe; which he was obliged to do every four or five minutes. Across the body were a number of small bands, annular divisions, or rather *ringæ* of the skin. By means of these the fish seemed to partake of the vermicular nature, had the power of lengthening or shortening its body like a worm, and could swim backwards as well as forwards, which is another property of the vermicular tribe. Every now and then it laid itself on one side in the water, as if to rest.

This fish hath the astonishing property of giving the electric shock to any person, or number of persons, either by the immediate touch with the hand, or by the mediation of any metallic conductor; and the person who kept them, told Dr Garden, that they had this property much stronger when first caught than afterwards: "The person (says he) who is to receive the shock, must take the fish with both hands, at some considerable distance asunder, so as to form the communication, otherwise he will not receive it: at least I never saw any one shocked from taking hold of it with one hand only; though some have assured me, that they were shocked by laying one hand on it. I myself have taken hold of the largest with one hand often, without ever receiving a shock; but I never touched it with both hands, at a little distance asunder, without feeling a smart shock. I have often remarked, that when it is taken hold of with one hand, and the other is put into the water over its body, without touching it, the person received a smart shock; and I have observed the same effect follow, when a number joined hands, and the person at one extremity of the circle took hold of or touched the fish, and the person at the other extremity put his hand into the water, over the body of the fish. The shock was communicated through the whole circle, as smartly as if both the extreme persons had touched the fish. In this it seems to differ widely from the *torpedo* *, or else we are much misinformed of the manner in which the benumbing effect of that fish is communicated. The shock with our Surinam fish gives, seems to be wholly electrical; and all the phenomena or properties of it exactly resemble those of the electric *aura* of our atmosphere when collected, as far as they are discoverable from the several trials made on this fish. This stroke is communicated by the same conductors, and intercepted by the interposition of the same original electric, or electric *per se* as they are used to be called. The keeper of this fish informs me, that he caught them in Surinam river, a great way up, beyond where the salt-water reaches; and that they are a fresh-water fish only. He says, that they are eaten, and by some people esteemed a great delicacy. They live on fish, worms, or any animal-food if it is cut small.

* See *Torpedo*.

Gymnotus. small so that they can swallow it. When small fishes are thrown into the water, they first give them a shock, which kills or so stupifies them, that they can swallow them easily, and without any trouble. If one of these small fishes, after it is shocked, and to all appearance dead, be taken out of the vessel where the electrical fish is, and put into fresh water, it will soon revive again. If a larger fish than they can swallow be thrown into the water, at a time that they are hungry, they give him some smart shocks, till he is apparently dead, and then they try to swallow or suck him in; but, after several attempts, finding he is too large, they quit him. Upon the most careful inspection of such fish, I could never see any mark of teeth, or the least wound or scratch on them. When the electrical fish are hungry, they are pretty keen after their food; but they are soon satisfied, not being able to contain much at one time. An electrical fish of three feet and upwards in length cannot swallow a small fish above three or at most three inches and a half long. I am told, that some of these have been seen in Surinam river upwards of 22 feet long, whose stroke or shock proved instant death to any person that unluckily received it."

Several other accounts of this fish have been published by different persons, but none of them so full and distinct as the above. They all agree that the electric virtue of the fish is very strong. Mr Fermín in his natural history of Surinam, published in 1765, tells us, that one cannot touch it with the hands, or even with a stick, without feeling a horrible numbness in the arms up to the shoulders; and he farther relates, that, making 14 persons grasp each other by the hands, while he grasped the hand of the last with one of his, and with the other touched the eel with a stick, the whole number felt so violent a shock, that he could not prevail on them to repeat the experiment. V. Vanderlott, in two letters from Rio Essequibo dated in 1761, makes two species, the black and the reddish; though he acknowledges, that, excepting the difference of colour and degree of strength, they are not materially different. In most experiments with these animals, he remarked a surprising resemblance between them and an electrical apparatus: nay, he observed, that the shock could be given to the finger of a person held at some distance from the bubble of air formed by the fish when he comes to the surface of the water to breathe; and he concluded, that at such times the electrical matter was discharged from its lungs. He mentions another characterizing circumstance, which is, that though metals in general were conductors of its electric property, yet some were found to be sensibly better than others for that purpose. Of this property Dr Priestley takes notice, and says that a gold ring is preferable to any thing else. The same is likewise observed by Linnæus. Dr Priestley adds, that the sensation is strongest when the fish is in motion, and is transmitted to a great distance; so that if persons in a ship happen to dip their fingers or feet in the sea, when the fish is swimming at the distance of 15 feet from them, they are affected by it. He also tells us, that the *gymnotus* itself, notwithstanding all its electric powers, is killed by the lobster.

GYNECEUM, among the ancients, the apartment of the women, a separate room in the inner part of the

house, when they employed themselves in spinning, weaving, and needle-work.

GYNECOCRACY, denotes the government of women, or a state where women are capable of the supreme command. Such are Britain and Spain.

GYNDANDRIA, (from *γυνή*, a "woman;" and *ανδρ*, a "man.") The name of the 20th class in Linnæus's sexual system, consisting of plants with hermaphrodite flowers, in which the stamina are placed upon the style, or, to speak more properly, upon a pillar-shaped receptacle, resembling a style, which rises in the middle of the flower, and bears both the stamina and pistil; that is, both the supposed organs of generation. See BOTANY, p. 1292.

The flowers of this class, says Linnæus, have a monstrous appearance, arising, as he imagines, from the singular and unusual situation of the parts of fructification.

GYPSIES, or EGYPTIANS, in our statutes, a kind of impostors and jugglers, who disguising themselves in uncouth habits, smearing their faces and bodies, and framing to themselves a canting language, wander up and down, and under pretence of telling fortunes, curing diseases, &c. abuse the common people, trick them of their money, and steal all that they can come at. There are several statutes made again them.

Egyptians coming into England are to depart the realm in fifteen days, or be imprisoned, by 22 Hen. VIII. cap. 10. And by 1 & 2 P. & M. cap. 4. any person importing them into this kingdom, shall forfeit forty pounds; and if they remain here above one month, or if any person, fourteen years old, consort with them, they are guilty of felony, without benefit of clergy; 5 Eliz. cap. 20. And we are informed by Sir M. Hale, that at one Suffolk assizes, no less than thirteen Gypsies were executed upon these statutes, a few years before the Restoration. See also 39 Eliz. cap. 4. § 2. 17 & Geo II. cap. 5. § 2.

The origin of this tribe of vagabonds is somewhat obscure; at least, the reason of the denomination is so. It is certain, the ancient Egyptians had the character of great cheats, and were famous for the subtilty of their impostures; whence the name might afterwards pass proverbially into other languages, as it is pretty certain it did into the Greek and Latin: on else, the ancient Egyptians, being much versed in astronomy, which in those days was little else but astrology, the name was on that score assumed by these tellers of good fortune.

Be this as it will, there is scarce any country of Europe but has its Egyptians, though not all of them under that denomination: the Latins call them *Ægyptii*; the Italians, *Cingani* and *Cingari*; the Germans, *Zigeuner*; the French, *Bohémiens*; others, *Saracens*; and others, *Tartari*, &c.

Münster, *Geogr. lib. iii. cap. 5.* relates, that they made their first appearance in Germany in 1417, exceedingly tawny and sun-burnt, and in pitiful array, though they affected quality, and travelled with a train of hunting-dogs after them, like nobles. The above date should probably have been 1517, as Münster himself owns he never saw any till 1524. He adds, that they had passports from king Sigismund of Bohemia, and other princes. Ten years afterwards, they came into France, and thence passed into England. Seve-

Gypses.

ral historians inform us, that when sultan Selim conquered Egypt in the year 1517, several of the natives refused to submit to the Turkish yoke; but, being at length subdued and banished, they agreed to disperse in small parties over the world, where their supposed skill in the black art gave them an universal reception in that age of superstition and credulity. In a few years, the number of their proselytes multiplied, and they became formidable to most of the states of Europe. Paquier, in his *Recherch. lib. iv. chap. 19.* relates a less probable origin of the Gypses, thus: On the 17th of April 1427, there came to Paris twelve penitents, or persons, as they said, adjudged to penance, viz. one duke, one count, and ten cavaliers or persons on horseback: they took on themselves the character of *Christians of the Lower Egypt*, expelled by the Saracens; who, having made application to the Pope, and confessed their sins, received for penance, that they should travel through the world for seven years, without ever lying on a bed. Their train consisted of 120 persons, men, women, and children; which were all that were left of 1200, who came together out of Egypt. They had lodgings assigned them in the chapel, and people went in crowds to see them. Their ears were perforated, and silver-buckles hung to them; their hair was exceedingly black, and frizzled; their women were ugly, thievish, and pretenders to telling of fortunes. The bishop soon afterwards obliged them to retire, and excommunicated such as had shewn them their hands.

By an ordonnance of the estates of Orleans in the year 1560, it was enjoined all these impostors, under the name of *Bohemians and Egyptians*, to quit the kingdom, on penalty of the galleys. Upon this they dispersed into lesser companies, and spread themselves over Europe. The first time we hear of them in England, was in the year 1530, when they were described by the statute already cited, 22 Hen. VIII. cap. 10. They were expelled from Spain in 1591.

Ralph. Volaterranus, making mention of them, affirms, that they first proceeded or strolled from among the Uxii, a people of Persia or Persia.

GYPsum, or PLASTER-STONE, in natural history, a genus of fossils, naturally and essentially simple, not inflammable nor soluble in water, and composed of flat small particles, which form bright, glossy, and in some degree transparent masses, not flexible or elastic, not giving fire with steel, nor fermenting with or being soluble in acid menstrua, and very easily calcined in the fire.

Of these gypsums, some are harder, others softer, and are of several colours, as white, grey, red, green, &c. sometimes distinct, and sometimes variously blended together.

The origin of all these gypsums is from the vitriolic acid and calcareous earth. See CHEMISTRY, n° 127. They are much used for stuccoing rooms, and for casting busts and statues; for which last purpose they are excellently adapted by the property they have of expanding when they set, or become solid, after being mixed with water. See PLASTER.

Gypsum by itself is very difficult of fusion: yet if a piece of forged iron is surrounded with gypsum in a crucible, and urged with a vehement heat, that metal, though otherwise unfusible, will be melted, and retain its malleability, though some say it assumes the nature of cast iron. Another very remarkable property of gypsum is, that when mixed with chalk, clay, limestone, and some other unfusible earths, they melt, in a heat not very great, into a yellowish glass. It is impossible, however, either to reduce this glass to a sufficient degree of fineness and transparency by itself, or by means of it to give a good yellow colour to other glass.

GYR-FALCO, in zoology, the name of a large and fierce species of falcon called in English the *jer-falcon*. See FALCO.

It is a very bold and daring bird, attacking all other fowl without reserve, particularly the heron and stork kinds. The other falcons are all afraid of this.

GYSHORN, a town of Germany in the duchy of Lunenburg, situated on the river Aller, in E. Long. 10. 45. N. Lat. 52. 50.

H.

H, The eighth letter and sixth consonant in our H, alphabet; though some grammarians will have it to be only an aspiration, or breathing. But nothing can be more ridiculous than to dispute its being a distinct sound, and formed in a particular manner by the organs of speech, at least in our language: witness the words *eat* and *beat*, *arm* and *harm*, *ear* and *hear*, *at* and *hat*, &c. as pronounced with or without the *h*.

It is pronounced by a strong expiration of the breath between the lips, closing, as it were, by a gentle motion of the lower jaw to the upper, and the tongue nearly approaching the palate.

There seems to be no doubt, but that our *h*, which is the same with that of the Romans, derived its figure

from that of the Hebrew ה. And, indeed, the Phœnicians, most ancient Greeks and Romans, used the same figure with our H, which in the series of all these alphabets keeps its primitive place, being the eighth letter.

H, used as a numeral, denotes 200; and with a dash over it, H, 200,000.

As an abbreviation, H was used by the ancients to denote *homo*, *hæres*, *hora*, &c. Thus H. B. stood for *heres bonorum*; and H. S. corruptly for L. L. S. *sesterc*; and H. A. for *Hadrianus*.

HAAG, or HAQ, a town of the duchy of Bavaria in Germany, seated on a hill on the west side of the river Inn, in E. Long. 12. 23. N. Lat. 48. 16.

HABAKKUK, one of the twelve lesser prophets, whose prophecies are taken into the canon of the Old Testa-

Gypsum
Gyhorn.

Testament. The name is wrote in the Hebrew with *h* *heth*; and signifies "a wrestler." There is no precise time mentioned in scripture when this Habakkuk lived; but from his predicting the ruin of the Jews by the Chaldeans, it may be concluded, that he prophesied before Zedekiah, or about the time of Manasseh. He is reported to have been the author of several prophecies which are not extant: but those that are indisputably his, are contained in three chapters. In these the prophet complains very pathetically of the disorders which he observed in the kingdom of Judæa. God reveals to him, that he would shortly punish them in a very terrible manner by the arms of the Chaldeans. He foretells the conquests of Nebuchadnezzar, his metamorphosis, and death. He foretells, that the vast designs of Jehoiakim would be frustrated. He speaks against a prince (probably the king of Tyre) who built with blood and iniquity; and he accuses another king (perhaps the king of Egypt) of having intoxicated his friend, in order to discover his nakedness. The third chapter is a song or prayer to God, whose majesty he describes with the utmost grandeur and sublimity of expression.

HABAT, a province of Asia, in Barbary, and in the kingdom of Fez. It is surrounded by the Mediterranean, the Straits of Gibraltar, and the Atlantic Ocean. The principal towns are Arzilla, Tetuan, and Ceuta; which last is in possession of the Spaniards.

HABDALA, a ceremony of the Jews observed on the evening of the sabbath, when every one of the family is come home. At that time they light a taper or lamp, with two wicks at least. The matter of the family then takes a cup, with some wine, mixed with fragrant spices, and having repeated a passage or two of scripture, as for example, "I will take the cup of salvation," &c. Psal. cxvi. "The Jews had light and gladness," &c. Eth. viii. he blesses the wine and spices. Afterwards he blesses the light of the fire; and then casts his eyes on his hands and nails, as remembering that he is going to work. The whole is intended to signify, that the sabbath is over, and is from that moment divided from the day of labour which follows. For this reason the ceremony is called *Habdala*, which signifies "distinction." After the ceremony is over, and the company breaks up, they wish one another, not "a good night," but "a good week."

HABES CORPUS, in law, is the great remedy in cases of *False Imprisonment*. The incapacity of the three other remedies referred to under that article, to give complete relief in every case, hath almost entirely antiquated them, and hath caused a general recourse to be had, in behalf of persons aggrieved by illegal imprisonment, to the present writ, the most celebrated in the English law. Of this there are various kinds made use of by the courts at Westminster, for removing prisoners from one court into another for the more easy administration of justice. Such is the *habeas corpus ad respondendum*, when a man hath a cause of action against one who is confined by the process of some inferior court; in order to remove the prisoner, and charge him with this new action in the court above. Such is that *ad satisfaciendum*, when a prisoner hath had judgment against him in an action, and the plaintiff is desirous to bring him up to some supe-

rior court to charge him with process of execution. Such also are those *ad prosequendum*, *testificandum*, *deliberandum*, &c.; which issue when it is necessary to remove a prisoner, in order to prosecute or bear testimony in any court, or to be tried in the proper jurisdiction wherein the fact was committed. Such is, lastly, the common writ *ad faciendum et recipiendum*, which issues out of any of the courts of Westminster-hall, when a person is sued in some inferior jurisdiction, and is desirous to remove the action into the superior court; commanding the inferior judges to produce the body of the defendant, together with the day and cause of his caption and detainer (whence the writ is frequently denominated an *habeas corpus cum causa*) to do and receive whatsoever the king's court shall consider in that behalf. This is a writ grantable of common right, without any motion in court; and it instantly supercedes all proceedings in the court below. But, in order to prevent the surreptitious discharge of prisoners, it is ordered by statute 1 & 2 P. & M. c. 13. that no *habeas corpus* shall issue to remove any prisoner out of any gaol, unless signed by some judge of the court out of which it is awarded. And, to avoid vexatious delays by removal of frivolous causes, it is enacted by statute 21 Jac. I. c. 23. that, where the judge of an inferior court of record is a barrister of three years standing, no cause shall be removed from thence by *habeas corpus* or other writ, after issue or demurrer deliberately joined: that no cause, if once remanded to the inferior court by writ of *procedendo* or otherwise, shall ever afterwards be again removed: and that no cause shall be removed at all, if the debt or damages laid in the declaration do not amount to the sum of five pounds. But an *expedient* having been found out to elude the latter branch of the statute, by procuring a nominal plaintiff to bring another action for five pounds or upwards, (and then by the course of the court the *habeas corpus* removed both actions together), it is therefore enacted by statute 12 Geo. I. c. 29. that the inferior court may proceed in such actions as are under the value of five pounds, notwithstanding other actions may be brought against the same defendant to a greater amount.

But the great and efficacious writ, in all manner of *Blackstone's* illegal confinement, is that of *habeas corpus ad subjiciendum*; directed to the person detaining another, and *ries* commanding him to produce the body of the prisoner, with the day and cause of his caption and detention, *ad faciendum, subjiciendum, et recipiendum*, to do, submit to, and receive whatsoever the judge or court awarding such writ shall consider in that behalf. This is a high prerogative writ, and therefore by the common law issuing out of the court of king's bench not only in term-time, but also during the vacation, by a *fiat* from the chief justice, or any other of the judges, and running into all parts of the king's dominions: for the king is at all times entitled to have an account, why the liberty of any of his subjects is restrained, wherever that restraint may be inflicted. If it issues in vacation, it is usually returnable before the judge himself who awarded it, and he proceeds by himself thereon; unless the term should intervene, and then it may be returned in court. Indeed, if the party were privileged in the courts of common pleas and exchequer, as being an officer or suitor of the court, an *habeas*

Habeas corpus.

habeas corpus ad subjiciendum might also have been awarded from thence; and, if the cause of imprisonment were palpably illegal, they might have discharged him: but, if he were committed for any criminal matter, they could only have remanded him, or taken bail for his appearance in the court of king's bench; which occasioned the common pleas to discountenance such applications. It hath also been said, and by very respectable authorities, that the like *habeas corpus* may issue out of the court of chancery in vacation: but, upon the famous application to lord Nottingham by Jenks, notwithstanding the most diligent searches, no precedent could be found where the chancellor had issued such a writ in vacation, and therefore his lordship refused it.

In the court of King's-bench it was, and is still, necessary to apply for it by motion to the court, as in the case of all other prerogative writs (*certiorari*, prohibition, *mandamus*, &c.) which do not issue as of mere course, without shewing some probable cause why the extraordinary power of the crown is called in to the party's assistance. For, as was argued by lord chief justice Vaughan, "it is granted on motion, because cause it cannot be had of course; and there is therefore no necessity to grant it: for the court ought to be satisfied that the party hath a probable cause to be delivered." And this seems the more reasonable, because (when once granted) the person to whom it is directed can return no satisfactory excuse for not bringing up the body of the prisoner. So that, if it issued of mere course, without shewing to the court or judge some reasonable ground for awarding it, a traitor or felon under sentence of death, a soldier or mariner in the king's service, a wife, a child, a relation, or a domestic, confined for insanity or other prudential reasons, might obtain a temporary enlargement by suing out an *habeas corpus*, though sure to be remanded as soon as brought up to the court. And therefore Sir Edward Coke, when chief justice, did not scruple, in 13 Jac. I. to deny a *habeas corpus* to one confined by the court of admiralty for piracy; there appearing, upon his own shewing, sufficient grounds to confine him. On the other hand, if a probable ground be shewn, that the party is imprisoned without just cause, and therefore hath a right to be delivered, the writ of *habeas corpus* is then a writ of right, which "may not be denied, but ought to be granted to every man that is committed, or detained in prison, or otherwise restrained, though it be by the command of the king, the privy-council, or any other."

In the articles LIBERTY and RIGHTS, we expatiated at large on the personal liberty of the subject. This was shewn to be a natural inherent right, which could not be surrendered or forfeited unless by the commission of some great and atrocious crime, and which ought not to be abridged in any case without the special permission of law. A doctrine coeval with the first rudiments of our constitution; and handed down to us from the Anglo-Saxons, notwithstanding all their struggles with the Danes, and the violence of the Norman conquest: asserted afterwards and confirmed by the conqueror himself and his descendants: and though sometimes a little impaired by the ferocity of the times, and the occasional despotism of jealous or

usurping princes, yet established on the firmest basis by the provisions of *magna charta*, and a long succession of statutes enacted under Edward III. To assert an absolute exemption from imprisonment in all cases, is inconsistent with every idea of law and political society; and in the end would destroy all civil liberty, by rendering its protection impossible: but the glory of the English law consists in clearly defining the times, the causes, and the extent, when, wherefore, and to what degree, the imprisonment of the subject may be lawful. This it is, which induces the absolute necessity of expelling upon every commitment the reason for which it is made; that the court, upon an *habeas corpus*, may examine into its validity; and according to the circumstances of the case may discharge, admit to bail, or remand the prisoner.

And yet, early in the reign of Charles I. the court of king's-bench, relying on some arbitrary precedents (and those perhaps misunderstood), determined * that they could not upon an *habeas corpus* either bail or deliver a prisoner, though committed without any cause assigned, in case he was committed by the special command of the king, or by the lords of the privy-council. This drew on a parliamentary inquiry, and produced the *petition of right*, 3 Car. I. which recites this illegal judgment, and enacts that no freeman hereafter shall be so imprisoned or detained. But when, in the following year, Mr Selden and others were committed by the lords of the council, in pursuance of his majesty's special command, under a general charge of "notable contempts and stirring up sedition against the king and government," the judges delayed for two terms (including also the long vacation) to deliver an opinion how far such a charge was bailable. And, when at length they agreed that it was, they however annexed a condition of finding sureties for the good behaviour, which still protracted their imprisonment; the chief justice Sir Nicholas Hyde, at the same time declaring †, that "if they were again remanded for that cause, perhaps the court would not afterwards grant a *habeas corpus*, being already made acquainted with the cause of the imprisonment." But this was heard with indignation and astonishment by every lawyer present; according to Mr Selden's own account of the matter, whose resentment was not cooled at the distance of four and twenty years.

These pitiful evasions gave rise to the statute 16 Car. I. c. 10. §. 8. whereby it is enacted, that if any person be committed by the king himself in person, or by his privy council, or by any of the members thereof, he shall have granted unto him, without any delay upon any pretence whatsoever, a writ of *habeas corpus*, upon demand or motion made to the court of king's bench or common-pleas; who shall therupon, within three court-days after the return is made, examine and determine the legality of such commitment, and do what to justice shall appertain, in delivering, bailing, or remanding such prisoner. Yet still in the case of Jenks, before alluded to, who in 1676 was committed by the king in council for a turbulent speech at Guildhall, new shifts and devices were made use of to prevent his enlargement by law; the chief justice (as well as the chancellor) declining to award a writ of *habeas corpus ad subjiciendum* in vacation, though

Habeas corpus.

Blackstone's Commentaries.

* State Trials, viii. 136.

† Ibid. 240.

Habeas
Corpus.Habeas
Habit.

though at last he thought proper to award the usual writs *ad deliberandum*, &c. whereby the prisoner was discharged at the Old Bailey. Other abuses had also crept into daily practice, which had in some measure defeated the benefit of this great constitutional remedy. The party imprisoning was at liberty to delay his obedience to the first writ, and might wait till a second and a third, called an *alias* and a *pluries*, were issued, before he produced the party: and many other vexatious shifts were practised to detain state-prisoners in custody. But whoever will attentively consider the English history may observe, that the flagrant abuse of any power, by the crown or its ministers, has always been productive of a struggle; which either discovers the exercise of that power to be contrary to law, or (if legal) restrains it for the future. This was the case in the present instance. The oppression of an obscure individual gave birth to the famous *habeas corpus* act, 31 Car. II. c. 2. which is frequently considered as another *magna carta* of the kingdom; and by consequence has also in subsequent times reduced the method of proceeding on these writs (though not within the reach of that statute, but issuing merely at the common law) to the true standard of law and liberty.

The statute itself enacts, 1. That the writ shall be returned and the prisoner brought up, within a limited time according to the distance, not exceeding in any case twenty days. 2. That such writs shall be endorsed, as granted in pursuance of this act, and signed by the person awarding them. 3. That on complaint and request in writing by or on behalf of any person committed and charged with any crime (unless committed for treason or felony expressed in the warrant, or for suspicion of the same, or as accessory thereto before the fact, or convicted or charged in execution by legal process) the lord chancellor or any of the twelve judges, in vacation, upon viewing a copy of the warrant, or affidavit that a copy is denied, shall (unless the party has neglected for two terms to apply to any court for his enlargement) award a *habeas corpus* for such prisoner, returnable immediately before himself or any other of the judges; and upon the return made shall discharge the party, if bailable, upon giving security to appear and answer to the accusation in the proper court of judicature. 4. That officers and keepers neglecting to make due returns, or not delivering to the prisoner or his agent within six hours after demand a copy of the warrant of commitment, or shifting the custody of a prisoner from one to another without sufficient reason or authority (specified in the act) shall for the first offence forfeit 100 l. and for the second offence 200 l. to the party grieved, and be disabled to hold his office. 5. That no person, once delivered by *habeas corpus*, shall be re-committed for the same offence, on penalty of 500 l. 6. That every person committed for treason or felony shall, if he requires it the first week of the next term or the first day of the next session of *oyer* and *terminer*, be indicted in that term or session, or else admitted to bail; unless the king's witnesses cannot be produced at that time: and if acquitted, or if not indicted and tried in the second term or session, he shall be discharged from his imprisonment for such imputed offence: but that no person,

Vol. V.

after the assizes shall be opened for the county in which he is detained, shall be removed by *habeas corpus*, till after the assizes are ended; but shall be left to the justice of the judges of assize. 7. That any such prisoner may move for and obtain his *habeas corpus*, as well out of the chancery or exchequer, as out of the king's bench or common pleas; and the lord chancellor or judges denying the same, on sight of the warrant or oath that the same is refused, forfeit severally to the party grieved the sum of 500 l. 8. That the writ of *habeas corpus* shall run into the counties palatine, cinque ports, and other privileged places, and the islands of Jersey and Guernsey. 9. That no inhabitant of England (except persons contracting, or convicted praying, to be transported; or having committed some capital offence in the place to which they are sent) shall be sent prisoner to Scotland, Ireland, Jersey, Guernsey, or any places beyond the seas, within or without the king's dominions: on pain that the party committing, his advisers, aiders, and assistants, shall forfeit to the party grieved a sum not less than 500 l. to be recovered with treble costs; shall be disabled to bear any office of trust or profit; shall incur the penalties of *præmunire*; and shall be incapable of the king's pardon.

This is the substance of that great and important statute: which extends (we may observe) only to the case of commitments for such criminal charge as can produce no inconvenience to public justice by a temporary enlargement of the prisoner; all other cases of unjust imprisonment being left to the *habeas corpus* at common law. But even upon writs at the common law it is now expected by the court, agreeable to ancient precedents and the spirit of the act of parliament, that the writ should be immediately obeyed, without waiting for any *alias* or *pluries*; otherwise an attachment will issue. By which admirable regulations, judicial as well as parliamentary, the remedy is now complete for removing the injury of unjust and illegal confinement. A remedy the more necessary, because the oppression does not always arise from the ill-nature, but sometimes from the mere inattention, of government. For it frequently happens in foreign countries, (and has happened in England during the temporary suspensions of the statute), that persons apprehended upon suspicion have suffered a long imprisonment, merely because they were forgotten.

HABICOT (Nicholas), a celebrated surgeon, born at Bonny in Gatiniois, acquired great reputation by his skill in his profession, and by his works; and died in 1624. He wrote a treatise on the plague, and several other curious works.

HABINGTON (William), an English poet and historian, was the son of Thomas Habington, Esq. He was born in 1605, at Hendlip in Worcestershire; and was educated at St Omers and at Paris. He died in 1654, and left several manuscripts in the hands of his son. His printed works are, 1. Poems under the title of *Cassura*. 2. The queen of Arragon, a tragi-comedy. 3. Observations upon History. 4. The history of Edward IV. king of England, written and published at the desire of Charles I. This work is composed in a very florid style.

HABIT, in philosophy, an aptitude or disposition either of mind or body, acquired by a frequent repetition

Habit
Hackney.

tion of the same act. See CUSTOM and HABIT.

HABIT is also used for a dress or garb, or the composition of garments, wherewith a person is covered; in which sense we say, the habit of an ecclesiastic, of a religious, &c. a military habit, &c.

HABIT and REPUTE, in Scots law, the common opinion of the people, among whom a person lives, with respect to any circumstance relating to him.

HABITUDE, among schoolmen, the respect or relation one thing bears to another. See RELATION.

HABSBURG, or HAPSBERG, an ancient castle of Switzerland, in the canton of Bern. It is the place where the ancient counts of Hapsburg resided, and is seated near the lake of Lucern, and to the east of the town of that name. E. Long. 8. 10. N. Lat. 47. 22.

HACHA, a sea-port town of South America, in Terra Firma, seated at the mouth of a river of the same name. Here the Spanish gallions touch at their arrival in South America, from whence expresses are sent to all the settlements to give them notice of it. W. Long. 72. 0. N. Lat. 11. 30.

HACKET (John), bishop of Litchfield and Coventry, was born in 1592. In 1623, he was made chaplain to James I. and prebendary of Lincoln: and soon after obtained the rectory of St Andrew's Holborn, with that of Cheam in Surrey; his patron telling him, he intended Holborn for wealth, and Cheam for health. In 1642 he was presented to a prebendary and rectory; but was deprived of the enjoyment of them, as well as of St Andrew's, by the ensuing troubles. He then lived retired at Cheam with little disturbance, until he recovered his preferments by the restoration of Charles II. by whom he was preferred to the see of Litchfield and Coventry in 1661. Finding the beautiful cathedral of Litchfield almost battered to the ground, he in eight years finished a complete church superior to the former, at his own expense of 20,000*l.* excepting 1000*l.* he had from the dean and chapter, with what he could procure from private benefactors. He laid out 1000*l.* on a prebendal house, his palaces at Litchfield and Ecclehall having been demolished during the civil wars: and beside these acts of munificence, left several other benefactions at his death in 1670. He published before he entered into orders, a comedy entitled *Lysola*, which was twice acted before king James I. After his death there appeared a "Century of his sermons on several remarkable subjects," in folio; and "The life of archbishop Williams," in folio, which was abridged in 1700 by Ambrose Philips.

HACKNEY-COACHES, those exposed to hire in the streets of London, and some other great cities, at rates fixed by authority. See COACH.—These first began to ply in the streets of London, or rather waited at inns, in the year 1625, and were only 20 in number; but in 1635 they were so much increased, that king Charles issued out an order of council for restraining them. In 1637, he allowed 50 hackney-coachmen, each of whom might keep 12 horses. In 1652, their number was limited to 200; and in 1654, it was extended to 300. In 1661, 400 were licensed; at 5*l.* annually for each. In 1694, 700 were allowed, and taxed by the 5 and 6 of W. & M. at 4*l.* per an-

num each. By 9 Anne cap. 23. 800 coaches were allowed in London and Westminster; but by 8 Geo. III. cap. 24. the number is increased to 1000, which are to be licensed by commissioners, and to pay a duty of 5*th.* per week to the king. On Sundays there were formerly only 175 hackney-coaches to ply, which were to be appointed by commissioners; but their number is now unlimited.

The fare of hackney coachmen in London, or within ten miles of the city, is 12 shillings and sixpence per day, allowing 12 hours per day. By the hour it is 1*s.* 6*d.* for the first, and 1*s.* for every hour after; and none are obliged to pay above 1*s.* for any distance not exceeding a mile and a half; or above 1*s.* 6*d.* for any distance not exceeding two miles. Where hackney coachmen refuse to go at, or exact more than, their limited hire, they are subject to a forfeit not under 10*s.* nor exceeding 3*l.* and which the commissioners have power to determine. Every hackney-coach must be provided with cheque strings, and every coachman plying without them incurs a penalty of 5*s.*—Drivers of hackney-coaches are to give way to persons of quality and gentlemen's coaches, under the penalty of 5*l.*

The duty arising from licences to hackney-coaches and chairs in London, forms a branch of the king's extraordinary and perpetual revenue*. This revenue is governed by commissioners of its own, and is in truth a benefit to the subject; as the expense of it is felt by no individual, and its necessary regulations have established a competent jurisdiction, whereby a very refractory race of men may be kept in some tolerable order.

HADDINGTON, a borough-town of Scotland, in East Lothian, which sends one member to parliament. It is surrounded with many seats of nobility and gentry. It is about 17 miles E. of Edinburgh. W. Long. 2. 25. N. Lat. 55. 50.

HADDOCK, the English name of a species of GADUS.

HADDON (Dr Walter), a great restorer of the learned languages in England, was born in 1516. He distinguished himself particularly by writing Latin in a fine style, which he acquired by a constant study of Cicero. He was a strenuous promoter of the reformation under king Edward; and was therefore thought a proper person to succeed bishop Gardiner in the mastership of Trinity-hall, Cambridge, on his deprivation. He lay concealed during the reign of queen Mary; but acquired the favour of Elizabeth, who constituted him one of the masters of the court of requests, and sent him one of the three agents to Bruges in 1566, to restore commerce between England and the Netherlands. He was also engaged with Sir John Cheke in drawing up in Latin that useful code of ecclesiastical law, published in 1571 by the learned John Fox, under the title of *Reformatio legum ecclesiasticarum*; his other works are collected and published under the title of *Incurabuntur*. He died in 1572.

HADERSLÉBEN, a sea-port town of Denmark, in the duchy of Sleswick, with a strong citadel, built upon a small island. It is seated on a bay of the Baltic Sea, and has a well-frequented harbour. E. Lon. 9. 35. N. Lat. 55. 24.

HADLEY,

Hackney
Haders-
leben.

* See REVENUE.

Hadley
Hæma-
topus.

HADLEY, a town in Suffolk, seated in a bottom on the river Preston. It consists of about 600 houses; with a very handsome church, a chapel of ease, and a Presbyterian meeting-house. The streets are pretty broad, but not paved. Large quantities of yarn are spun here for the Norwich manufacture; and this town had once a considerable woollen manufacture, which is now decayed. E. Lon. 1. o. N. Lat. 52. 7.

HADRIAN. See **ADRIAN**.

HÆMAGOGOS, among physicians, a compound medicus, consisting of feid and aromatic simples mixed with black hellebore, and prescribed in order to promote the menstria and hemorrhoidal fluxes; as also to bring away the lochia.

HÆMANTHUS, the BLOOD-FLOWER; a genus of the monogynia order, belonging to the hexandria class of plants.

Species. 1. The coccineus, with plain tongue-shaped leaves, rises about a foot high, with a stalk supporting a cluster of bright red tubulous flowers. It hath a large bulbous root, from which in the autumn comes out two broad flat leaves of a fleshy consistence, shaped like a tongue, which turn backward on each side, and spread on the ground, so that they have a strange appearance all the winter. In the spring these decay; so that from May to the beginning of August they are destitute of leaves. The flowers are produced in the autumn just before the leaves come out. 2. The carinatus with keel-shaped leaves, has a taller stalk and paler flowers than the former; its leaves are not flat, but hollowed like the keel of a boat. 3. The punicus, with large spear-shaped waved leaves, grows about a foot high, and hath flowers of a yellowish red colour. These are succeeded by berries, which are of a beautiful red colour when ripe.

Culture. All these plants are natives of the Cape of Good Hope, and do not propagate very fast in Europe, their roots seldom putting forth many off-sets. The best method of managing them is to have a bed of good earth in a bricked pit, where they may be covered with glasses, and in hard frosts with mats and straw. The earth in the frame should be two feet deep, and the frame should rise two feet above the surface, to allow height for the flower-stems to grow. The roots should be planted nine or ten inches asunder; and in winter, if they are protected from frost, and not suffered to have too much wet, but in mild weather exposed to the air, they will flower every year, and the flowers will be much stronger than with any other management. The third sort requires to be constantly kept in a dry stove.

HÆMATITES, or BLOOD-STONE, a hard mineral substance, red, black, or purple, but the powder of which is always red. It is found in masses sometimes spherical, semi-spherical, pyramidal, or cellular, that is like a honeycomb. It contains a large quantity of iron. Forty pounds of this metal have been extracted from a quintal of the stone; but the iron is of such a bad quality, that this ore is not commonly smelted. The great hardness of hæmatites renders it fit for burnishing and polishing metals.

HÆMATOPUS, the SEA-PYE, in ornithology, a genus belonging to the order of gallæ. The beak is compressed, with an equal wedge-shaped point; the nostrils are linear; and the feet have three toes without

nails. There is but one species, viz. the adalagus, a native of Europe and America. It feeds upon shell-fish near the sea-shore.

HÆMATOXYLUM, LOGWOOD, or *Campeachy Wood*; a genus of the monogynia order, belonging to the decandria class of plants.

Species. Of this genus there is only one species, viz. the campechianum, which grows naturally in the bay of Campeachy at Honduras, and other parts of the Spanish West-Indies*, where it rises from 16 to 24 feet high. The stems are generally crooked, and very deformed; and seldom thicker than a man's thigh. The branches which come out on each side are crooked, irregular, and armed with strong thorns, garnished with winged leaves, composed of three pair of obscure lobes indented at the top. The flowers come in a racemus from the wings of the leaves standing erect, and are of a pale yellowish colour, with a purple empalement. They are succeeded by flat oblong pods, each containing two or three kidney-seeds.

Culture. The seeds, which are frequently brought from America, will readily grow if sown upon a good hot-bed in this country, and will thrive very well if kept constantly in a good degree of heat in the back-stove.

Uses. The logwood is used in great quantities for dying purple, but especially black colours. All the colours, however, which can be prepared from it, are of a fading nature, and cannot by any art be made equally durable with those prepared from some other materials. Of all the colours prepared from logwood, the black is the most durable. Dr Lewis recommends it as an ingredient in making ink. "In dyeing cloth," (says he), vitriol and galls, in whatever proportions they are used, produce only browns of different shades: I have often been surprised that with these capital materials of the black dye I never could obtain any true blackness in white cloth, and attributed the failure to some unheeded mismanagement in the process, till I found it to be a known fact among the dyers. Logwood is the material which adds blackness to the vitriol and gall-brown; and this black dye, though not of the most durable kind, is the most common. On blue cloth a good black may be dyed by vitriol and galls alone; but even here, an addition of Logwood contributes not a little to improve the colour."—Mr Delaval, however, in his Essay on Colours, informs us, that with an infusion of galls and iron-silings, he not only made an exceeding black and durable ink, but also dyed linen cloth of a very deep black. See *COLOUR-MAKING*, n° 12, 13, 14.; *DYEING*, n° 17.; and *INK*. Logwood is also found to have a considerable astringent virtue as a medicine, and an extract of it is sometimes given with great success in diarrheas.

HÆMOPTYSIS, **HÆMPTYSIS**, or *Hæmoptis*; a spitting of blood. See (*Index* subjoined to) *MEDICINE*.

HÆMORRHOIDAL, an appellation given by anatomists to the arteries and veins going to the intestinum rectum.

HÆMORRHOIDS, or **PILES**, an hæmorrhage, or issue of blood from the hæmorrhoidal vessels. (See (*Index* subjoined to) *MEDICINE*.)

HAERLEM. See **HARLEM**.

HAG, in zoology. See **MYXINE**.

Hamster
xylum

Hæg

* See *Campeachy*.

Hagai
Hague.Hague
Hall.

HAGAI, a canonical book of the Old Testament, so called from the prophet of that name, who, in all probability was born at Babylon, from whence he returned with Zerubbabel.

This prophet, by the command of God, exhorted the Jews, after their return from the captivity, to finish the rebuilding of the temple, which they had intermitted for 14 years. His remonstrances had the desired effect; and to encourage them to proceed in the work, he assured them from God, that the glory of this latter house should be greater than the glory of the former: which was accordingly fulfilled, when Christ honoured it with his presence; for, with respect to the building, this latter temple was nothing in comparison with the former.

HAGEDORN (Frederick de), a celebrated German poet, was born at Hamburg, where his father was resident for the king of Denmark, in 1708. He finished his studies at Jena; and, in 1728, published a number of poetical pieces in Germany, which were well received. He afterwards came to England, where he obtained the friendship of many of the learned; and, at his return, was made secretary to the English Hamburg company, a lucrative employment that left him sufficient time for cultivating the muses. In 1738, he published his Fables and Tales, the first collection of the kind of which Germany can boast. He afterwards published other pieces of poetry of different kinds, as Moral Poems, Epigrams, and five books of Songs: which of all his poetical pieces are most esteemed. He died in 1754.

HAGENAU, a town of Germany, and capital of a bailiwick of the same name, which was formerly imperial, but now belongs to the French. It was taken by them in 1673; the Imperialists retook it in 1702; after which it was several times taken and retaken by both parties; but at last the French got possession of it in 1706. It is divided by the river Motter into two parts; and is seated near a forest of its own name, in E. Long. 7. 53. N. Lat. 48. 49.

HAGIOGRAPHIA, or "holy writings;" a name given to a particular division of the Old Testament, as containing hymns to God, and moral precepts for the conduct of life. The books distinguished by this term were the Psalms, Proverbs, Ecclesiastes, and the Song of Solomon.

HAGUE, a town of the United Provinces, in Holland, situated in E. Long. 4. 10. N. Lat. 48. 49.—In Latin it is called *Haga Comitii*; in French, *La Haye*; in Dutch *der Haag*, or *'S-Graaenbuge*, i. e. the Earl's Grove or Wood, from the wood near which it is built, and in which the earls of Holland had a country-house. Though it sends no deputies to the states, it is one of the most considerable towns in Holland, pleasantly situated, and exceeding beautiful. It may indeed compare with almost any city in Europe, though geographers account it but a village. The inhabitants also breathe a better air than those of the other cities, as it stands on a dry soil, somewhat higher than the rest of the country. It has no gates or walls, but is surrounded by a moat over which there are many draw-bridges. Two hours are required to walk round it, and it contains about 40,000 or 50,000 souls. It is a place of much splendor and business, being the seat of the high colleges of the

republic and province of Holland, and the residence of the stadtholder and foreign ambassadors; and there are a great many fine streets and squares in it. In the inner court all the high colleges and courts of justice hold their assemblies: there also the foot-guards do duty, as the horse-guards in the outer, when the states are sitting. De Plaats is an open airy place, in form of a triangle, adorned with neat and beautiful buildings: the Vyverberg is an eminence, laid out into several fine shady walks, with the Vyver, a large basin of water, at the bottom: the Voorhout is the most celebrated part of the Hague, and consists of the mall, and three ways for coaches on each side, planted with trees, being much the same as St James's park at London: the palace of Opdam, or Wassenaar, is built in a very elegant taste: the prince and princess grafts are fine streets: the plain, in Dutch *Het Pleyn*, is a beautiful grove, laid out in several cross walks, and surrounded with stately houses. The Jewish synagogue is well worth being seen by a curious traveller; and also the palaces of the prince of Orange, the hotel of Spain, the new Voorhout, the mausoleum of the baron of Opdam in the great church, and the several hospitals. The environs of the Hague are exceedingly pleasant. Among other agreeable objects are the wood, with the palace of Orange at the extremity of it, called the *house in the wood*; the village of Scheveling; and the sand-hills along the north-sea; with the village of Voorburg, and the charming seats and fine gardens round it. Two miles from the Hague is Ryfwick, a village: and, a quarter of a mile from that, a noble palace belonging to the prince of Orange, famous for the treaty of peace concluded there in 1697. Loosduynen, where Margaret, countess of Henneburg, and daughter of Florence IV. count of Holland and Zealand, is said to have been delivered of 365 children at a birth, in 1276, is about five miles from the Hague. Five miles beyond Loosduynen, and not far from the beautiful village of Gravelande, is Honslardyck, another palace belonging to the prince of Orange, and one of the finest structures in the Low-Countries.

HAHN (Simon Frederick), a celebrated German historian. At ten years of age he was not only far advanced in the Latin, but understood several living languages. Four years after, he pronounced a speech on the origin of the cloyster at Bergen, the place of his birth, which was printed with some other pieces; and in 1708 he published a *Continuation of Meibomius's Chronicle of Bergen*. After having for several years given public lectures at Hall, he became, at the age of 24, professor of history at Helmstadt; and was at length counsellor, historiographer, and librarian, to the king of Great Britain, elector of Hanover. He died in 1729, aged 37.—Besides the above, and some other works, he wrote, 1. The first volume of the *History of the Empire*. 2. *Collectio monumentorum veterum et recentium ineditorum*, 2 vols 8vo.

HAIL, in natural history, a meteor generally defined frozen rain, but differing from it in that the hailstones are not formed of single pieces of ice, but of many little spherules agglutinated together. Neither are these spherules all of the same consistence; some of them being hard and solid like perfect ice; others soft, and mostly like snow hardened by a severe frost. Sometimes

Hail.

times the hailstone hath a kind of core of this soft matter; but more frequently the core is solid and hard, while the outside is formed of a softer matter. Hailstones assume various figures, being sometimes round, at other times pyramidal, crenated, angular, thin, and flat, and sometimes flattened, with six radii like the small crystals of snow.

Natural historians furnish us with various accounts of surprising showers of hail, in which the hailstones were of extraordinary magnitude. Mezeray, speaking of the war of Louis XII. in Italy, in the year 1510, relates, that there was for some time an horrible darkness, thicker than that of night; after which the clouds broke into thunder and lightning, and there fell a shower of hailstones, or rather (as he calls them) pebble-stones, which destroyed all the fish, birds, and beasts of the country.—It was attended with a strong smell of sulphur; and the stones were of a bluish colour, some of them weighing an hundred pounds. *Hist. de France*, Tom. II. p. 339.

At Lille in Flanders, in 1686, fell hailstones of a very large size; some of which contained in the middle a dark brown matter, which, thrown on the fire, gave a very great report. *Philosoph. Transact.* N° 203.

Dr Halley and others also relate, that in Cheshire, Lancashire, &c. April 29, 1697, a thick black cloud, coming from Carnarvonshire, disposed the vapours to congeal in such a manner, that for about the breadth of two miles, which was the limit of the cloud, in its progress for the space of 60 miles, it did inconceivable damage; not only killing all sorts of fowls and other small animals, but splitting trees, knocking down horses and men, and even ploughing up the earth; so that the hailstones buried themselves under ground an inch, or an inch and a half deep. The hailstones, many of which weighed five ounces, and some half a pound, and being five or six inches about, were of various figures; some round, others half round; some smooth, others embossed and crenated: the icy substance of them was very transparent and hard, but there was a snowy kernel in the middle of them.

In Hertfordshire, May 4. the same year, after a severe storm of thunder and lightning, a shower of hail succeeded, which far exceeded the former: some persons were killed by it, their bodies beat all black and blue; vast oaks were split, and fields of rye cut down as with a scythe. The stones measured from 10 to 13 or 14 inches about. Their figures were various, some oval, others picked, some flat. *Philosoph. Transact.* N° 229.

It is remarkable, that, far as we know, hail is a meteor which never produces any beneficial effect. The rain and dew invigorate and give life to the whole vegetable tribe; the frost, by expanding the water contained in the earth, pulverises and renders the soil fertile; snow covers and preserves the tender vegetables from being destroyed by too severe a frost. But hail does none of all these. In winter, it lies not sufficiently close to cover vegetables from the nipping frosts; and in spring and summer it not only has a chilling and blasting effect from its coldness, but often does great damage to the more tender plants by the weight of the stones, and in great hail-storms the damage done in this manner is prodigious.

Hail is one of the natural phenomena for which

it is almost impossible to account in any satisfactory manner. It is certain, that on the tops of mountains hailstones, as well as drops of rain, are very small, and continually increase in bulk till they reach the lower grounds. It would seem, therefore, that during their passage through the air, they attract the congealed vapour which increases them in size. But here we are at a loss how they come to be solid hard bodies, and not always soft, and composed of many small flats like snow. The flakes of snow, no doubt, increase in size as they descend, as well as the drops of rain or hail-stones; but why should the one be in soft crystals, and the other in large hard lumps, seeing both are produced from congealed vapour? Some modern philosophers ascribe the formation of hail to electricity. Signior Beccaria supposes hail to be formed in the higher regions of the air, where the cold is intense, and where the electric matter is very copious. In these circumstances, a great number of particles of water are brought near together, where they are frozen, and in their descent collect other particles, so that the density of the substance of the hailstone grows less and less from the centre; this being formed first in the higher regions, and the surface being collected in the lower. Agreeable to this, it is observed, that, in mountains, hail-stones, as well as drops of rain, are very small, there being but little space through which they can fall and increase their bulk. Drops of rain and hail also agree in this, that the more intense the electricity that forms them, the larger they are. Motion is known to promote freezing, and so the rapid motion of the electrified clouds may produce that effect. A more intense electricity also, he thinks, unites the particles of hail more closely than the more moderate electricity does those of snow. In like manner we see thunder-clouds more dense than those that merely bring rain; and the drops of rain are larger in proportion, though they fall not from so great a height.

HAILING, the salutation or accosting of a ship at a distance, either at sea, or in a harbour. The usual expression is, "Hoe, the ship ahoy!" To which the answers, "Holloa! Whence came ye? Where are ye bound? Good voyage! What cheer? All well! How fare ye?" &c.

HAILLAN (Bernard de Girard, lord of), a celebrated French historian. After having made some figure in the literary world, and as a translator, he applied himself to history with such success, that in 1571, Charles IX. made him historiographer of France. His history of France extends from Pharamon to the death of Charles VII. and is the first complete history of that kingdom composed in the French tongue. He was honoured by Henry III. with several marks of favour; and proposed to continue his history to the reign of Henry IV. but did not perform his promise. He died at Paris in 1610.

HAIMSUCKEN, see HAMBSECKEN.

HAINAN, a considerable island of Asia, situated in between 18° and 20° N. Lat. It belongs to China; and lies to the north of the Gulf of Cochinchina, and about twelve miles south from the province of Canton. It is about 400 miles in circumference. The soil of the northern parts is level, but the southern and eastern ones are mountainous; among which some

Hailing
Hainan.

of the valleys produce two crops of rice every year. The inhabitants are generally short, deformed savages, of a reddish colour. In the interior parts of the island they have not submitted to the Chinese; but they are great cowards, and 50 Chinese will put 100 of them to flight. There are mines of gold and lapis lazuli, which last is carried to Canton to paint the porcelain. This island produces the same fruits as China, besides sugar, tobacco, cotton, and indigo.

HAINAULT, a province of the Netherlands, belonging partly to France and partly to the house of Austria. It is bounded to the south by Champagne and Picardy, to the north by Flanders, to the east by the duchy of Brabant, the county of Namur, and the bishopric of Liege; and to the west by Artois and Flanders. Its extent from north to south is about 45 miles, and about 48 from east to west. The air is pleasant and temperate, and the soil fruitful: it abounds in rich pastures, corn-fields, woods, and forests, coal, iron, lead, beautiful marble, slate, and other useful stones: it is well watered by rivers and lakes, and breeds abundance of black cattle, and sheep, whose wool is very fine. Its principal rivers are the Schelde, the Selle, and the Dender. This province is reckoned to contain 24 walled towns, 950 villages, one duchy, and several principalities, earldoms, peerdoms, and baronies. The abbays in it are 27. For spiritual matters, the greater part of it is subject to the archbishop of Cambray, and the rest to the bishops of Liege and Arras. The states of the province consist of the clergy, nobility, and commoners. The clergy are the abbots, deputies of the chapters, and rural deans; but the chapters of St Waudru and St Germain, in Mons, send no deputies, as they contribute nothing to the public taxes. The nobility consist of the earls and barons, and all those who, by their birth, have a right to a seat in the assembly of the states. The commoners are composed of the deputies of the towns. The clergy in this county are uncommonly rich. The states meet only when they are summoned by the sovereign; but there is a standing committee at Mons, which meets weekly. This county had counts of its own, till the year 1436; when Philip the Good, duke of Burgundy, arrived to the possession of it, upon the death of Jaqueline, the heiress, without issue. The French acquired that part of it which they possess, partly by the peace of the Pyrenees, and partly by those of Nimegen and Renswyck. The arms of this county are quartered, and contain four lions, in a field *or*. For the government of it, there is a sovereign-council, at the head of which is the high-bailiff, who has very great authority: he represents the sovereign, is governor of Mons, and captain-general of the province.

* See *Antiquary*, n° 81.

HAIR, small filaments, issuing out of the pores of the skins of animals; and serving most of them as a tegument or covering*.—In lieu of hair, the nakedness of some animals is covered with feathers, wool, skins, &c. Hair is found on all parts of the human body, except the soles of the feet and the palms of the hands.—But it grows longest on the head, chin, breast, in the arm-pits, and about the privities.

The ancients held the hair a sort of excrement, fed only with excrementitious matters, and no proper part of a living body.—They supposed it generated of the

fuliginous parts of the blood, exhaled by the heat of the body to the surface, and there condensed in passing through the pores.—Their chief reasons were, that the hair being cut, will grow again apace, even in extreme old age, and when life is very low: that in hectic and consumptive people, where the rest of the body is continually emaciating and attenuating, the hair shall thrive: nay, and that it will grow again in dead carcasses.—They added, that hair does not feed and grow, like the other parts, by introluception, *i. e.* by a juice circulating within it; but, like the nails, by juxtaposition, each part next the root thrusting forward that immediately before it.

But the moderns are agreed, that every hair does properly and truly live, and receive nutriment to fill and distend it like the other parts: which they argue hence, that the roots do not turn grey in aged persons sooner than the extremities, but the whole changes colour at once, and the like is observed in boys, &c.; which shews that there is a direct communication, and that all the parts are affected alike.

It may be observed, however, that, in propriety, the life and growth of hairs is of a different kind from that of the rest of the body; and is not immediately derived therefrom, or reciprocated therewith.—It is rather of the nature of vegetation. They grow as plants do out of the earth; or as some plants shoot from the parts of others; from which though they draw their nourishment, yet each has, as it were, its several life and a distinct economy.—They derive their food from some juices in the body, but not from the nutritious juices of the body; whence they may live, tho' the body be starved.—Wulferus, in the *Philosophical Collections*, gives an account of a woman buried at Norimberg, whose grave being opened 43 years after her death, there was hair found issuing forth plentifully through the clefts of the coffin; inasmuch, that there was reason to imagine the coffin had some time been covered all over with hair.—The cover being removed, the whole corps appeared in its perfect shape; but, from the crown of the head to the sole of the foot, covered over with a thick-set hair, long and curled.—The sexton going to handle the upper part of the head with his fingers, the whole structure fell at once, leaving nothing in his hand but an bundle of hair: there was neither skull nor any other bone left; yet the hair was solid and strong enough.—Mr Arnold, in the same collection, gives a relation of a man hanged for theft, who, in a little time, while he yet hung upon the gallows, had his body strangely covered over with hair.—Some moderns, however, deny the authenticity of these and other similar instances.

The hairs ordinarily appear round or cylindrical; but the microscope also discovers triangular and square ones; which diversity of figure arises from that of the pores, to which the hairs always accommodate themselves. Their length depends on the quantity of the proper humour to feed them, and their colour on the quality of that humour: whence, at different stages of life, the colour usually differs. Their extremities split into two or three branches, especially when kept dry, or suffered to grow too long; so that what appears only a single hair to the naked eye, seems a brush to the microscope.

The hair of a mouse, viewed by Mr Derham with a micro-

Hair.

microscope, seemed to be one single transparent tube, with a pith made up of fibrous substances, running in dark lines, in some hairs transversely, in others spirally. The darker medullary parts or lines, he observes, were no other than small fibres convolved round, and lying closer together than in the other parts of the hair. They run from the bottom to the top of the hair; and, he imagines, may serve to make a gentle evacuation of some humour out of the body. Hence the hair of hairy animals, this author suggests, may not only serve as a fence against cold, &c. but as an organ of insensible perspiration.

Though the external surface of the body is the natural place for hairs, we have many well-attested instances of their being found also on the internal surface. Amatus Lusitanus mentions a person who had hair upon his tongue. Pliny and Valerius Maximus concur in their testimonies, that the heart of Aristomenes the Messenian was hairy. Celsus Rhodiginus relates the fame of Hermogenes the rhetorician; and Plutarch, of Leonidas the Spartan.—Hairs are said to have been frequently found in the breasts of women, and to have occasioned the dilemma called *trichiasis*; but some authors are of opinion, that these are small worms and not hairs. There have been, however, various and indisputable observations of hairs found in the kidneys, and voided by urine.

Hippocrates is of opinion, that the glandular parts are the most subject to hair; but bundles of hair have been found in the muscular parts of beef, and in such parts of the human body as are equally firm with that.—Hair has been often found in abscesses and imposthumations. Schultetus, opening the abdomen of a woman, found 12 pints of water, and a large lock or bundle of hair swimming loose in it. But of all the internal parts, there is none so much subject to an unnatural growth of hair as the ovaries of females, and that as well of the human species as of other animals. Of this Dr Tyson relates three remarkable instances; two of these were young women, and the other was a bitch. The animal had been much emaciated in its hinder parts; the hair was about an inch and an half long; but the most remarkable particular was, that hair was also found lying loose in the cavities of the veins. We have several instances of mankind being affected in the same manner. Cardan relates, that he found hair in the blood of a Spaniard; and Slonatus in that of a gentlewoman of Cracovia; and Schultetus declares from his own observation, that those people who are afflicted with the *plica polonica*, have very often hair in their blood.

Diseases of the Hair. Almost the only disease of the hair, besides the remarkable one called *plica polonica*, is its falling off, or *balbesci*. For this many remedies have been recommended, but scarce any of them can be depended upon. The juice of burdock, and the lixivial salts of vine-ashes, are said to be efficacious; also the powder of hermodactyls, and the decoction of boxwood. A remarkable instance of the efficacy of this last is given under the article *Buxus*.—Some authors give instances of the hair changing its colour in a short time, thro' grief, or by reason of a fright, &c.

Human-Hair makes a considerable article of trade; the goodness of it consists in its being neither too coarse nor too slender.

Hair that does not curl or buckle naturally, is made to do so by first boiling, and then baking it. Having sorted it, they next roll it carefully upon pipes hollowed in the middle; these they put into a pot or cauldron, and let them boil about two hours; then taking them out, they are dried and covered with papers; and, lastly, sent to the pally-cook, who bakes them in an oven, till the crull with which they are covered is about three fourths baked.

The hair of several other animals, as the beaver, hare, coney, &c. is also used in commerce, and especially in the manufacture of hats. See *HAT*.

Staining of Hair. Hair may be changed from a red, grey, or other disagreeable colour, to a brown or deep black, by a solution of silver. The liquors sold under the name of *hair-waters*, are at bottom no more than solutions of silver in aqua-fortis, largely diluted with water, with the addition perhaps of other ingredients, which contribute nothing to their efficacy. The solution should be fully saturated with the silver, that there may be no more acid in it than is necessary for holding the metal dissolved; and besides dilution with water, a little spirit of wine may be added for the further dulcification of the acid. It must be observed, that, for diluting the solution, distilled water, or pure rain-water, must be used; the common spring-waters turning it milky, and precipitating a part of the dissolved silver. It is to be observed also, that if the liquor touches the skin, it has the same effect on it as on the matter to be stained, changing the part moistened with it to an indelible black.—Hair may also be dyed of any colour in the same manner as wool*. * See *Dyeing*.

HAIR as an *Emblem of Dignity, or of Religion*. It was esteemed a notable honour among the ancient Gauls to have long hair, and hence came the appellation *Gallia comata*. For this reason Julius Cæsar, upon subduing the Gauls, made them cut off their hair as a token of submission.—It was with a view to this, that such as afterwards quitted the world to go and live in cloisters, procured their hair to be shaven off; to shew that they bid adieu to all earthly ornaments, and made a vow of perpetual subjection to their superiors.

Greg. of Tours assures us, that in the royal family of France, it was a long time the peculiar mark and privilege of kings and princes of the blood to wear long hair, artfully dressed and curled: every body else was obliged to be polled, or cut round, in sign of inferiority and obedience. Some writers assure us, that there were different cuts for all the different qualities and conditions; from the prince who wore it at full length, to the slave or villain who was quite cropt.—To cut off the hair of a son of France, under the first race of kings, was to declare him excluded from the right of succeeding to the crown, and reduced to the condition of a subject.

In the eighth century, it was the custom of people of quality to have their childrens hair cut the first time by persons they had a particular honour and esteem for; who, in virtue of this ceremony, were reputed a sort of spiritual parents or godfathers thereof: Tho' this practice appears to have been more ancient; inasmuch as we read, that Constantine sent the pope the hair of his son Heraclius, as a token that he desired him to be his adoptive father.

The parade of long hair became still more and more ob-

Hair.

Hair. obnoxious in the progress of Christianity, as something utterly inconsistent with the profession of persons who bore the cross. Hence numerous injunctions and canons to the contrary.—Pope Anicetus is commonly supposed to have been the first who forbade the clergy to wear long hair: but the prohibition is of an older standing in the churches of the east; and the letter wherein that decree is wrote, is of a much later date than that pope.—The clerical tonsure is related by Hildore Hispanensis, as of apostolical institution.

Long hair was anciently held so odious, that there is a canon still extant of the year 1096, importing, that such as wore long hair, should be excluded coming into church while living, and not be prayed for when dead.

We have a furious declamation of Luitprand against the emperor Phocas, for wearing long hair, after the manner of the other emperors of the east, all except Theophilus, who being bald, enjoined all his subjects to have their heads.

The French historians and antiquaries have been very exact in recording the head of hair of their several kings. Charlemagne wore it very short, his son shorter; Charles the bald had none at all. Under Hugh Capet it began to appear again; this the ecclesiastics took in dudgeon, and excommunicated all who let their hair grow. Peter Lombard expostulated the matter so warmly with Charles the Young, that he cut off his hair; and his successors for some generations wore it very short.—A professor of Utrecht, in 1650, wrote expressly on the question, Whether it be lawful for men to wear long hair? and concluded for the negative.—Another divine, named Reves, who had wrote for the affirmative, replied to him.

The Greeks, and after their example, the Romans, wore false hair. See *PERUKE*.

HAIR, in farriery, is generally called the *coat*; and, with regard to horses, deserves particular consideration.

The hair growing on the fetlock, serves as a defence to the prominent part of it, in travelling in stony ways, or in frosty weather: if the hair of a horse's neck, and the parts most uncovered, be close, smooth and sleek, it is an indication of his being in health and good case. In order to make the hair of an horse soft and sleek, he must be kept warm at heart, for the least inward cold will cause the hair to flare; also sweat him often, for that will loosen and raise the dust and filth that renders his coat foul; and when he is in the heat of a sweat, scrape off all the white foam, sweat, and filth, that is raised up, with an old sword-blade; and also when he is blooded, if you rub him all over with his own blood, repeating it two or three days, and curry and dress him well, it will make his coat shine as if covered with a fine varnish.

Hair falling from the main or tail, is caused either by his having taken some heat, which has engendered a dry mange; or from some surfeit which causes the evil humours to resort to those parts. To cure this, anoint the horse's mane and crest with black soap; make a strong lee of ashes, and wash it all over with it. But if a canker should grow on a horse's tail, which will eat away both flesh and bone; then put some oil of vitriol to it, and it will consume it: and if you find that the vitriol corrodes too much, you need only to

wet it with cold water, and it will put a stop to it.

If you would take away hair from any part of a horse's body, boil half a pound of lime in a quart of water, till a fourth part is consumed, to which add an ounce of orpiment; make this into a plaster, and lay it on.

HAIR, or *Down*, of Plants; a general term expressive of all the hairy and glandular appearances on the surface of plants, to which they are supposed by naturalists to serve the double purpose of defensive weapons and vessels of secretion.

These hairs are minute threads of greater or less length and solidity; some of them visible to the naked eye; whilst others are rendered visible only by the help of glasses. Examined by a microscope, almost all the parts of plants, particularly the young stalks or stems, appear covered with hairs.

Hairs on the surface of plants present themselves under various forms: in the leguminous plants, they are generally cylindric; in the mallow tribe, terminated in a point; in agrimony, shaped like a fish-hook; in nettle, awl-shaped and jointed; and in some compound flowers with hollow or funnel-shaped florets, they are terminated in two crooked points.

Probable as some experiments have rendered it, that the hairs on the surface of plants contribute to some organical secretion, their principal use seems to be to preserve the parts in which they are lodged from the bad effects of violent frictions, from winds, from extremes of heat and cold, and such like external injuries.

M. Guettard, who has established a botanical method from the form, situation, and other circumstances of the hairy and glandular appearances on the surface of plants, has demonstrated, that these appearances are generally constant and uniform in all the plants of the same genus. The same uniformity seems to characterize all the different genera of the same natural order.

The different sorts of hairs which form the down upon the surface of plants were imperfectly distinguished by Grew in 1682, and by Malpighi in 1686. Mr Guettard just mentioned, was the first who examined the subject both as a botanist and a philosopher; his observations were published in 1747.

HAKLUYT (Richard), a naval historian, is supposed to have been born in London about the year 1553, and descended of a genteel family in Herefordshire, as the name frequently occurs in the list of high sheriffs for that county, in former reigns. He was educated at Westminster school; and thence, in 1570, removed to Christ-church, Oxford; where he applied himself particularly to the study of cosmography, and read public lectures in that science.

Sir Edward Stafford being sent ambassador to France in 1583, Mr Hakluyt was one of his attendants, probably in the capacity of chaplain. He was at this time master of arts, and professor of divinity. In 1585 he obtained the royal mandate for the next vacant prebend of Bristol, to which preferment he succeeded during his residence at Paris. Constantly attentive to his favourite cosmographical inquiries, in searching the French libraries, he found a valuable history of Florida, which had been discovered about 20 years before, by Captain Loudonniere, and others: this he caused to be published, at his own expence, in the French language,

Hair,
Hakluyt.

Hakluyt
Halberstadt

language, and soon after revised and republished Peter Martyr's book *De orbe novo*. After five years residence in France, Mr Hakluyt returned to England in company with lady Sheffield, sister to the lord admiral Howard. In the year 1599 he published his Collection of Voyages in one folio volume, which in 1598 was republished in three. In 1605, our author was made prebendary of Westminster; which, with the rectory of Wetheringset in the county of Suffolk, seems to have been the summit of his preferment. He died in 1616, and was buried in Westminster abbey, bequeathing to his son Edmund his manor of Bridge-Place, and several houses in Tothill-street, Westminster. He was an indefatigable and faithful historian. His works are, 1. A collection of voyages and discoveries, a small volume. 2. History of Florida, above-mentioned. 3. The principal navigations, voyages, and discoveries of the English nation, made by sea or over land to the most and farthest distant quarters of the earth, at any time within the compass of these 1500 years, in 3 vols folio. 4. The discoveries of the world, from the first original to the year 1555, written in the Portugal tongue by Ant. Galvano; corrected, much amended, and translated into English, by Richard Hakluyt. 5. Virginia richly valued, by the description of the main land of Florida, her next neighbour, &c. written by a Portugal gentleman of Elvas, and translated by Richard Hakluyt. Besides these, he left several manuscripts, which were printed in Purchas's collection.

HALBERSTADT, a small-principality of Germany, bounded on the north-east by the duchy of Magdeburg, on the south by the principality of Anhalt, on the west by the diocese of Hildheim, on the east by part of the electorate of Saxony, and on the north by Brunswick Wolfenbüttele. It is near 40 miles in length and 30 in breadth. The soil in general is fertile in corn and flax; and there are some woods, though in general fuel is scarce. There are three large towns in it which send representatives to the diet, together with ten small ones, and 91 county-towns and villages. The number of the inhabitants is computed at about 200,000: the greatest part of them are Lutherans; but there are also Calvinists, Jews, and Roman Catholics. The manufactures are chiefly woollen (for the country produces a great number of sheep); the exports are grain, and a kind of beer called *brai-han*. The annual revenue arising from this principality, and the incorporated counties and lordships, is said to amount to 500,000 rix-dollars. Till the treaty of Westphalia in 1648, this country was a diocese, but was then transferred to the electoral house of Brandenburg as a temporal principality. It is entitled to a vote both in the diet of the empire, and that of the circle. The principal places are Halberstadt, Groningen, Ocherseben, Osterwick, &c.

HALBERSTADT, a city of Germany, in the circle of Lower Saxony, seated near the river Hotheln. It is a neat uniform place; and has some good churches and other handsome buildings, of which the cathedral is the chief. There is an inn in this place, which is looked upon to be the largest and to have the best accommodations of any in Europe. Before the Reformation, it was a bishop's see. E. Long. 11. 29. N. Lat. 52. 6.

Vol. V.

Halbert
Hale.

HALBERT, or HALBARD, in the art of war, a well-known weapon carried by the sergeants of foot and dragoons. It is a sort of spear, the shaft of which is about five feet long, and made of ash or other wood. Its head is armed with a steel point, not unlike the point of a two-edged sword. But, besides this sharp point which is in a line with the shaft, there is a cross piece of steel, flat and pointed at both ends; but generally with a cutting edge at one extremity, and a bent sharp point at the other; so that it serves equally to cut down, or to push withal. It is also useful in determining the ground between the ranks, and adjusting the files of a battalion. The word is formed of the German *hal* "hall," and *bard* "an hatchet." Vossius derives it from the German *hellebaert*, of *hel*, "clarus, splendens," and *baert*, "ax."

The halbert was anciently a common weapon in the army; where there were companies of halbardiers. It is said to have been used by the Amazons, and afterwards by the Rhætiens and Vindelicians about the year 570.

It was called the *Danish ax*, because the Danes bore an halbert on the left shoulder. From the Danes it was derived to the Scots; from the Scots to the English Saxons; and from them to the French.

HALCYON, in ornithology, a name given by the ancients to the alcedo or king's-fisher. See ALCEDO.

HALCYON-DAYS, in antiquity, a name given to seven days before and as many after the winter-solstice; by reason the halcyon, invited by the calmness of the weather, laid its eggs in nests built in the rocks, close by the brink of the sea, at this season.

HALDE (John Baptist du), a learned French Jesuit born at Paris in 1674. He was extremely well versed in Asiatic geography; and we have of his compilation a work intitled *Grand description de la Chine & de la Tartarie*, from original memoirs of the Jesuitical missionaries, in 4 vols, folio. He was also concerned in a collection of letters begun by father Gobien, called *Des lettres edifiantes*, in 18 vols; and published some Latin poems and orations. He died in 1743.

HALE, in the sea-language, signifies *pull*; as, To hale up, is to pull up; to hale in or out, is to pull in or out. To over-hale a rope, is to hale it too tiff, or to hale it the contrary way.

KEEL-HALE. See DUCKING.

HALE (Sir Matthew,) lord chief justice of the king's-bench in the reign of Charles II. was the son of Robert Hale, esq; a barrister of Lincoln's Inn, and was born in 1609. He was educated at Oxford, where he made a considerable progress in learning; but was afterwards diverted from his studies by the levities of youth. From these he was reformed by Mr John Glanvill, serjeant at law; and applying to the study of the law, entered into Lincoln's Inn. Noy, the attorney-general, took early notice of him, and directed him in his studies. Mr Selden also took much notice of him; and it was this acquaintance that first set Mr Hale on a more enlarged pursuit of learning, which he had before confined to his own profession. During the civil wars, he behaved so well as to gain the esteem of both parties. He was employed in his practice by all the king's party; and was appointed by the parliament one of the commissioners to treat with the

Hale.

king. The murder of king Charles gave him very sensible regret. However, he took the engagement; and was appointed, with several others, to consider of the reformation of the law. In 1653 he was by writ made sergeant at law, and soon after appointed one of the justices of the Common Pleas. Upon the death of Oliver Cromwell he refused to accept of the new commission offered him by Richard his successor. He was returned one of the knights of Gloucestershire in the parliament which called home Charles II. Soon after, he was made lord chief baron of the exchequer; but declined the honour of knighthood, till lord chancellor Hyde, sending for him upon business when the king was at his house, told his Majesty, that "there was his modest chief baron;" upon which he was unexpectedly knighted. He was one of the principal judges that sat in Clifford's Inn about settling the difference between landlord and tenant, after the fire of London, in which he behaved to the satisfaction of all parties concerned, and also in his post of chief baron acted with inflexible integrity. One of the first peers went once to his chamber, and told him, "That having a suit in law to be tried before him, he was then to acquaint him with it, that he might the better understand it when it should come to be tried in court." Upon which the lord chief baron interrupted him, and said, "He did not deal fairly to come to his chambers about such affairs; for he never received information of such causes but in open court, where both parties were to be heard alike." Upon which his Grace (for it was a duke) went away not a little dissatisfied, and complained of it to the king as a rudeness that was not to be endured: but his Majesty bid him content himself that he was used no worse; and said, "That he verily believed, he would have used him no better, if he had gone to solicit him in any of his own causes." Another remarkable incident happened in one of his circuits. A gentleman who had a trial at the assizes had sent him a buck for his table. When judge Hale therefore heard his name, he asked "if he was not the same person who had sent him the venison?" and finding that he was the same, told him, that "he could not suffer the trial to go on till he had paid him for his buck." The gentleman answered, that "he never sold his venison; and that he had done nothing to him, which he did not do to every judge who had gone that circuit;" which was confirmed by several gentlemen present. The lord chief baron, however, would not suffer the trial to proceed till he had paid for the present: upon which the gentleman withdrew the record. In short, he was, in 1671, advanced to be lord chief justice of the king's bench; but about four years after this promotion, his health declining, he resigned his post in February 1675-6, and died in December following. This excellent man, who was an ornament to the bench, to his country, and to human nature, wrote, 1. An essay on the gravitation and non-gravitation of fluid bodies. 2. Observations touching the Torricellian experiment. 3. Contemplations, moral and divine. 4. The life of Pomponius Atticus, with political and moral reflections. 5. Observations on the principles of natural motion. 6. The primitive origin of mankind. He also left a great number of manuscripts, in Latin and English, upon various subjects; among which are, his "Pleas of the Crown,"

Hales.

since published by Mr Emyln in two volumes folio; and his "Original institution, power, and jurisdiction of Parliaments."

HALES (Stephen), D. D. a celebrated divine and philosopher, was born in 1677. He was the sixth son of Thomas Hales, Esq; the eldest son of Sir Robert Hales created a baronet by king Charles II. and Mary the heirs of Richard Langley of Abbots-Wood in Hertfordshire. In 1696, he was entered a pensioner at Bennet-College, Cambridge; and was admitted a fellow in 1703, and became bachelor of divinity in 1711. He soon discovered a genius for natural philosophy. Botany was his first study; and he used frequently to make excursions among Gogmagog hills, in company with Dr Stukely, with a view of prosecuting that study. In these expeditions he likewise collected fossils and insects, having contrived a curious instrument for catching such of the latter as have wings. In company with this friend he also applied himself to the study of anatomy, and invented a curious method of obtaining a representation of the lungs in lead. They next applied themselves to the study of chemistry; in which, however, they did not make any remarkable discoveries.

In the study of astronomy Mr Hales was equally assiduous. Having made himself acquainted with the Newtonian system, he contrived a machine for shewing the phenomena on much the same principles with that afterwards made by Mr Rowley, and, from the name of his patron, called an *Orrery*.

About the year 1710, he was presented to the perpetual cure of Teddington near Twickenham, in Middlesex; and afterwards accepted of the living of Porlock in Somersetshire, which vacated his fellowship in the college, and which he exchanged for the living of Faringdon in Hampshire.

Soon after, he married Mary, the daughter and heiress of Dr Newce, who was rector of Haliham in Suffex, but resided at Much-Haddam in Hertfordshire.

On the 13th of March 1718, he was elected member of the Royal Society; and on the 5th of March, in the year following, he exhibited an account of some experiments he had lately made on the effect of the sun's warmth in raising the sap in trees. This procured him the thanks of the society, who also requested him to prosecute the subject. With this request he complied with great pleasure; and on the 14th of June 1725, exhibited a treatise in which he gave an account of his progress. This treatise being highly applauded by the society, he farther enlarged and improved it; and in April 1727 he published it under the title of *Vegetable Statics*. This work he dedicated to his late majesty king George the second, who was then prince of Wales; and he was, the same year, chosen one of the council of the Royal Society, Sir Hans Sloan being at the same annual election chosen their president. The book being well received, a second edition of it was published in 1731; in a preface to this edition Mr Hales promised a sequel to the work, which he published in 1733, under the title of *Statical essays*, &c.

In 1732, he was appointed one of the trustees for establishing a new colony in Georgia. On the 5th of July 1733, the university of Oxford honoured him with

with a diploma for the degree of doctor in divinity; a mark of distinction the more honourable, as it is not usual for one university to confer academical honours on those who were educated at another.

In 1734, when the health and morals of the lower and middling class of people were subverted by the excessive drinking of gin, he published, though without his name, "A friendly admonition to the drinkers of brandy and other spirituous liquors;" which was twice re-printed. The latter end of the same year he published a sermon which he preached at St Bride's before the rest of the trustees for establishing a new colony in Georgia. His text was, *Bear ye one another's burthens, and so fulfil the law of Christ*; Galatians vi. 2.

In 1739, he printed a volume in 8vo, intitled, *Philosophical experiments on sea-water, corn, flesh, and other substances*: this work, which contained many useful instructions for voyagers, was dedicated to the lords of the admiralty. The same year he exhibited to the Royal Society an account of some farther experiments towards the discovery of medicines for dissolving the stone in the kidneys and bladder, and preserving meat in long voyages; for which he received the gold medal of Sir Godfrey Copley's donation. The year following he published some account of "Experiments and observations on Mrs Stephens's medicines for dissolving the stone, in which their dissolvent power is inquired into and demonstrated."

In 1741, he read before the Royal Society an account of an instrument which he invented, and called a *ventilator*, for conveying fresh air into mines, hospitals, prisons, and the close parts of ships: he had communicated it to his particular friends some months before; and it is very remarkable that a machine of the same kind, for the same purpose, was in the spring of the same year invented by one Martin Tricwald, an officer in the service of the king of Sweden, called *captain of mechanics*, for which the king and senate granted him a privilege in October following, and ordered every ship of war in the service of that state to be furnished with one of them; a model also of this machine was sent into France, and all the ships in the French navy were also ordered to have a ventilator of the same sort.

It happened also, that about the same time an Sutton, who kept a coffee house in Aldersgate-street, invented a ventilator of another construction to draw off the foul air out of ships, by means of the cook-room fire: but poor Sutton had not interest enough to make mankind accept the benefit he offered them; though its superiority to Dr Hales's contrivance was evident, and among others Dr Mead and the late ingenious Mr Benjamin Robins gave their testimony in its favour. See *Air-Pipes*.

The public, however, is not less indebted to the ingenuity and benevolence of Dr Hales, whose ventilators came more easily into use for many purposes of the greatest importance to life, particularly for keeping corn sweet, by blowing through it fresh showers of air; a practice very soon adopted by France, a large granary having been made, under the direction of Duhamel, for the preservation of corn in this manner, with a view to make it a general practice.

In 1743, Dr Hales read before the Royal Society a description of a method of conveying liquors into the *abdomen* during the operation of tapping, and it was afterwards printed in their Transactions. In 1745, he published some experiments and observations on tar-water, which he had been induced to make by the publication of a work called *Siris*, in which the late learned and most excellent Dr Berkeley, bishop of Cloyne, had recommended tar-water as an universal medicine: on this occasion several letters passed between them on the subject, particularly with respect to the use of tar-water in the disease of the horned cattle.

In the same year he communicated to the public, by a letter to the editor of the Gentleman's Magazine, a description of a *back-heaver*, which will winnow and clean corn much sooner and better than can be done by the common method. He also, at the same time, and by the same channel, communicated to the public a cheap and easy way to preserve corn sweet in sacks; an invention of great benefit to farmers, especially to poor leasers, who want to keep small quantities of corn for some time, but have no proper granary or repository for that purpose. He also the same year took the same method to publish directions how to keep corn sweet in heaps without turning it, and to sweeten it when musty. He published a long paper, containing an account of several methods to preserve corn by ventilators; with a particular description of several sorts of ventilators, illustrated by a cut, so that the whole mechanism of them may be easily known, and the machine constructed by a common carpenter. He published also in the same volume, but without his name, a detection of the fallacious boasts concerning the efficacy of the liquid shell in dissolving the stone in the bladder. In 1746 he communicated to the Royal Society a proposal for bringing small passable stones soon, and with ease, out of the bladder; and this was also printed in their Transactions. In the Gentleman's Magazine for July 1747, he published an account of a very considerable improvement of his back-heaver, by which it became capable of clearing corn of the very small grain, seeds, blacks, smut-balls, &c. to such perfection as to make it fit for seed-corn. In 1748 he communicated to the Royal Society a proposal for checking, in some degree, the progress of fires, occasioned by the great fire which happened that year in Cornhill: And the substance of this proposal was printed in their Transactions. In the same year he also communicated to the Society two memoirs, which are printed in their Transactions; one on the great benefit of ventilators, and the other on some experiments in electricity.

In 1749 his ventilators were fixed in the Savoy prison, by order of the right hon. Henry Fox, esq; then secretary at war, afterwards lord Holland; and the benefit was so great, that though 50 or 100 in a year often died of the gaol-distemper before, yet from the year 1749 to the year 1752 inclusive, no more than four persons died, though in the year 1750 the number of prisoners was 240; and of those four, one died of the small-pox, and another of intemperance.

In the year 1750 he published some considerations on the causes of earthquakes; occasioned by the slight shocks felt that year in London. The substance of

Hales.

this work was also printed in the Philosophical Transactions. The same year he exhibited an examination of the strength of several purging waters, especially of the water of *Jessop's well*, which is printed in the Philosophical Transactions.

He had now been several years honoured with the esteem and friendship of his royal highness Frederick prince of Wales; who frequently visited him at Teddington, from his neighbouring palace at Kew, and took a pleasure in surprising him in the midst of those curious researches into the various parts of nature which almost incessantly employed him. Upon the prince's death, which happened this year, and the settlement of the household of the prince's dowager, he was, without his solicitation, or even knowledge, appointed clerk of the closet, or almoner to her royal highness.

In 1751 he was chosen by the college of physicians to preach the annual sermon called *Crowne's lecture*: Dr William Crowne having left a legacy for a sermon to be annually preached on "the wisdom and goodness of God displayed in the formation of man." Dr Hales's text was, *With the ancient is wisdom, and in length of days understanding*, Job xii. 12. This sermon, as usual, was published at the request of the college.

In the latter end of the year 1752, his ventilators, worked by a windmill, were fixed in Newgate, with branching trunks to 24 wards; and it appeared that the disproportion of those that died in the gaol before and after this establishment was as 16 to 7. He published also a farther account of their success, and some observations on the great danger arising from foul air, exemplified by a narrative of several persons seized with the gaol fever by working in Newgate.

On the death of Sir Hans Sloane, which happened in the year 1753, he was elected a member of the Academy of Sciences at Paris in his room. The same year he published in the Gentleman's Magazine some farther considerations about means to draw the foul air out of the sick rooms of occasional army-hospitals, and private houses in town. He also published many other curious particulars relative to the use and success of ventilators. The same year a description of a sea-gage, which the doctor invented to measure unfathomable depths, was communicated to the public in the same miscellany: this paper was drawn up about the year 1732 or 1733, by the doctor, for the late Colin Campbell, esq; who employed the ingenious Mr Hawksbee to make the machine it describes, which was tried in various depths, and answered with great exactness, yet was at last lost near Bermuda.

In 1754, he communicated to the Royal Society some experiments for keeping water and fish sweet with lime-water, an account of which was published in the Phil. Transf. He also continued to enrich their memoirs with many useful articles from this time till his death, particularly a method of forwarding the distillation of fresh from salt water by blowing flowers of fresh air up through the latter during the operation.

In 1757 he communicated to the editor of the Gentleman's Magazine, an easy method of purifying the air, and regulating its heat in melon-frames and green-houses, also further improvements in his method of distilling sea-water.

Hales

Hall-Beigh.

His reputation and the interest of his family and friends might easily have procured him farther preferment: but of farther preferment he was not desirous; for being nominated by his late majesty to a canony of Windfor, he engaged the prince to request his majesty to recall his nomination. That a man so devoted to philosophical studies and employments, and so conscientious in the discharge of his duty, should not desire any preferment which would reduce him to the dilemma either of neglecting his duty, or foregoing his amusement, is not strange: but that he would refuse an honourable and profitable appointment, for which no duty was to be done that would interrupt his habits of life, can scarce be imputed to his temperance and humility without impeaching his benevolence; for if he had no will of any thing more for himself, a liberal mind would surely have been highly gratified by the distribution of so considerable a sum as a canony of Windfor would have put into his power, in the reward of industry, the alleviation of distress, and the support of helpless indigence. He was, however, remarkable for social virtue and sweetness of temper; his life was not only blameless, but exemplary in a high degree; he was happy in himself, and beneficial to others, as appears by this account of his attainments and pursuits; the constant serenity and cheerfulness of his mind, and the temperance and regularity of his life, concurred, with a good constitution, to preserve him in health and vigour to the uncommon age of fourscore and four years.

He died at Teddington in 1761; and was buried, pursuant to his own directions, under the tower of the parish church, which he built at his own expence not long before his death.—Her royal highness the prince of Wales erected a monument to his memory in Westminster abbey.

HALESWORTH, a town of Suffolk in England, seated on a neck of land between two branches of the river Blith. It is a well frequented thriving place, and has a trade in linen-yarn and sail-cloth. It has one large church, and about 600 good houses; but the streets are neither wide nor paved. About the town is raised a great deal of hemp. E. Long. 1. 40. N. Lat. 52. 30.

HALF-BLOOD, in law, is where a man marries a second wife, the first being dead, and by the first venter has a son, and by his second venter has likewise a son; the two brothers, in this case, are but of half-blood. See **CONSANGUINITY** and **DESCENT**.

HALF-Merk; a noble, or 6s. 8 d.

HALF-Moon, in fortification; an outwork composed of two faces, forming a salient angle, whose gorge is in form of a crescent or half-moon, whence the name.

HALI-BEIGH, first dragoman or interpreter at the Grand Signior's court in the 17th century, was born of Christian parents in Poland; but having been taken by the Tartars when he was young, they sold him to the Turks, who brought him up in their religion in the seraglio. His name, in his native country, was Bobowski. He learnt many languages, and Sir Paul Ricaut owns he was indebted to him for several things which he relates in his *Present state of the Ottoman empire*. He held a great correspondence with the English, who persuaded him to translate some books into the Turkish language; aut

and he had a mind to return into the bosom of the Christian church, but died before he could accomplish the design. Dr Hyde published his book *Of the liturgy of the Turks, their pilgrimages to Mecca, their circumcision and visiting of the sick*. He translated the catechism of the church of England, and the bible, into the Turkish language. The MS. is lodged in the library of Leyden. He wrote likewise a Turkish grammar and dictionary.

HALIETUS, in ornithology. See **FALCO**.

HALIFAX, the capital of the province of Nova Scotia in America, situated in W. Long. 64. 30. N. Lat. 44. 45. It was founded in 1749, in order to secure the British settlements there from the attempts of the French and Indians. It was divided into 35 squares, each containing 16 lots of 40 by 60 feet; one established church, and one meeting-house, and a small number of houses out of the regular streets, which are 65 feet broad. The town was surrounded by picketings, and guarded by forts on the outside; but, since the commencement of the American troubles, it has been very strongly fortified. Along the river Chebucto, to the southward of the town, are buildings and fish-flakes for at least two miles, and to the northward on the river for about one mile. The plan, however, has been greatly improved by the earl of Halifax, who was the original contriver. The proclamation issued for this settlement, offered 50 acres of land to every soldier and sailor who would settle in that part of America, without paying any rent or doing any service for ten years, and no more than one shilling per annum for each 50 acres ever afterwards: to every soldier and sailor who had a wife and children, ten acres more were added for every individual of his family, and for every increase that should afterwards happen in the same proportion. To each subaltern officer, 80 acres, and 15 for each of his family; 200 acres to each ensign; 300 to each lieutenant; 400 to each captain; 600 to every officer in rank above a captain, and 30 for each of his family. The government also engaged to transport and maintain the new settlers for one year at its own expence, and to furnish them with such arms, provisions, utensils, implements, &c. as should be necessary to put them in a way to cultivate their lands, to build habitations, and to commence a fishery. The same conditions were likewise offered to all carpenters and other handicraftsmen; and furgeons were offered the same conditions with the ensigns.—This proclamation was published in March, and by the month of May 3700 persons had offered themselves. They accordingly embarked, and established themselves in the bay of Chebucto; calling their city *Halifax*, from the title of their patron. Before the end of October the same year, 350 comfortable wooden houses were built, and as many more during the winter.—The same year in which the settlers embarked, the government granted them 40,000*l*. for their expences. In 1750, they granted 57,582*l*. 17*s*. 3½*d*. for the same purpose; in 1751, 53,927*l*. 14*s*. 4*d*.; in 1752, 61,492*l*. 19*s*. 4½*d*.; in 1753, 94,615*l*. 12*s*. 4*d*.; in 1754, 58,447*l*. 2*s*.; and in 1755, 49,418*l*. 7*s*. 8*d*.

HALIFAX, earl of. See **SAVILLE**.

HALIFAX, a town in the west riding of Yorkshire in England, seated on the river Calder, in W. Long.

2. o. N. Lat. 53. 45. It has the title of an earldom, and is very eminent for the clothier trade. The parish is said to be the most populous, if not the most extensive, in England: for it is above 30 miles in circumference; and, besides the mother-church at Halifax, and 16 meeting-houses, has 12 chapels, two of which are parochial. What is a little singular, all the meeting-houses here, except the quakers, have bells and burying grounds. The woollens principally manufactured here, are kerseys and shalloons. Of the former it is affirmed, that one dealer hath sent by commission 60,000 pounds worth in a year to Holland and Hamburg; and of the latter, it is said, 100,000 pieces are made in this parish yearly. The inhabitants here, and in the neighbouring towns, are so entirely employed in these manufactures, that agriculture is but little minded. Most of their provisions of all sorts are brought from the north and east ridings, and from Lancashire, Cheshire, Nottinghamshire, and Warwickshire. The markets are very much crowded for the buying and selling provisions and manufactures. The cloths, at the first erecting of the woollen manufactures in these parts, having been frequently stolen off the tenters in the night, a law was made, by which the magistrates of Halifax were empowered to pass sentence on and execute all offenders, if they were taken in the fact, or owned it, or if the stolen cloth was found upon them, provided also the crime was committed, and the criminal apprehended, within the liberties of the forest of Hardwick. Those found guilty were executed in the following manner: an axe was drawn by a pulley to the top of a wooden engine, and fastened by a pin, which being pulled out, the axe fell down in an instant, and did its work. If they had stole an ox, horse, or any other beast, it was led with them to the scaffold, and there fastened by a cord to the pin, that held up the axe; and when the signal was given by the jurors, who were the first burghers within the several towns of the forest, the beast was driven away, and the pin plucked out, upon which the axe fell and did its office. This severe and summary course of justice, gave occasion to a litany, which is still much more frequent in the mouths of the beggars and vagrants of these parts, than is the common prayer, viz.

“From Hell, Hull, and Halifax, good Lord deliver us:”

though neither the engine, nor manner of proceeding against them, are now in use.

HALIOTIS, the **EAR-SHELL**, a genus of insects belonging to the order of vermes testacea. This is an animal of the snail-kind, with an open shell resembling an ear. There are seven species, distinguished by the figure of their shells. See **PLATE CLVIII**.

HALITZ, a town of Poland, and capital of a territory of the same name, in Red Russia, with a castle. It is seated on the river Neister. E. Long. 26. o. N. Lat. 49. 20.

HALL, in architecture, a large room at the entrance of a fine house and palace. Vitruvius mentions three kinds of halls; the tetrastyle, with four columns, supporting the platform or ceiling; the Corinthian, with columns all round let into the wall, and vaulted over; and the Egyptian, which had a peristyle of insulated Corinthian columns, bearing a second order with a ceiling.

The hall is properly the finest as well as first member of an apartment; and in the houses of ministers of state, magistrates, &c. is the place where they dispatch business, and give audience. In very magnificent buildings, where the hall is larger and loftier than ordinary, and placed in the middle of the house, it is called a *saloon*.

The length of a hall should be at least twice and a quarter its breadth; and in great buildings, three times its breadth. As to the height of halls, it may be two thirds of the breadth; and, if made with an arched ceiling, it will be much handfomer, and less liable to accidents by fire. In this case, its height is found by dividing its breadth into six parts, five of which will be the height from the floor to the under side of the key of the arch.

HALL (Joseph), an eminent prelate of the church of England, was born in 1574, and educated at Cambridge. He became professor of Rhetoric in that university, and then successively was made rector of Halsted in Suffolk, presented to the living of Waltham in Essex, made prebendary of Wolverhampton, dean of Worcester, bishop of Exeter, and lastly of Norwich.

His works testify his zeal against Popery, and are much esteemed. He lamented the divisions of the Protestants, and wrote something concerning the means of putting an end to them. July 1616, he attended the embassy of lord Doncaister into France, and upon his return was appointed by his majesty to be one of the divines who should attend him into Scotland. In 1618 he was sent to the synod of Dort with other divines, and pitched upon to preach a Latin sermon before that assembly. But being obliged to return from thence before the synod broke up, on account of his health, he was by the states presented with a gold medal. He wrote, 1. Miscellaneous epistles. 2. *Mundus alter et idem*. 3. A just censure of travellers. 4. The Christian Seneca. 5. Satires, in six books. 6. A century of meditations; and many other works, which, besides the above satires, make in all five volumes in folio and quarto. He died in 1656.

HALL (John), a poet of distinguished learning, was born at Durham, and educated at Cambridge, where he was esteemed the brightest genius in that university. In 1646, when he was but 19 years of age, he published his *Horæ Vacuæ*, or Essays; and the same year came out his poems. He translated from the Greek "Hierocles upon the golden verses of Pythagoras;" before which is an account of the ingenious translator and his works, by John Davies of Kidwelly. He died in 1656, aged 29.

HALLAGE, a fee or toll paid for cloth brought to be sold in Blackwell-hall, London.

HALLAMASS. See ALL-SAINTS.

HALLAND, a country of Sweden, in the island of Schonen, lying along the sea-coast, at the entrance of the Baltic Sea, and opposite to Jutland. It is 60 miles along the coast, but is not above 12 in breadth. Halmstadt is the capital town.

HALLATON, a town of Leicestershire, in England. It is seated on a rich soil, 12 miles south-east of Leicester, in E. Lon. o. 50. N. Lat. 52. 35.

HALLE, a little dismantled town of the Austrian Netherlands, in Hainault. The church of Notre

Dame contains an image of the Virgin Mary, held in great veneration. E. Lon. 3. 15. N. Lat. 50. 44.

HALLE, a handsome and considerable town of Germany, in the circle of Upper Saxony, and in the duchy of Magdeburg, with a famous university and salt-works. It belongs to the king of Prussia; and is seated in a pleasant plain on the river Sale, in E. Lon. 12. 33. N. Lat. 51. 36.

HALLE, a free and imperial town of Germany, in Suabia, famous for its salt-pits. It is seated on the river Kocher, among rocks and mountains, in E. Lon. 10. 50. N. Lat. 49. 6.

HALLEIN, a town of Germany, in the circle of Bavaria, and archbishopric of Salzburg; seated on the river Saltza, among the mountains, wherein are mines of salt, which are the chief riches of the town and country. E. Lon. 12. 15. N. Lat. 47. 33.

HALLELUJA, a word signifying "Praise the Lord." The singing halleluja (first introduced into the church-service by St Jerom), was a sort of invitational, or call to each other, to praise the Lord. St Austin says, that in some churches it was sung only on Easter-day, and the 50 days of Pentecost; but that even in those churches where it was most in use, it was never used in the time of Lent.

HALLER (Albert Van), an eminent physician, was born at Bern, on the 16th of October 1708. He was the son of an advocate, of considerable eminence in his profession. His father had a numerous family, and Albert was the youngest of five sons. From the first period of his education, he shewed a very great genius for literature of every kind; to forward the progress of his studies, his father took into his family a private tutor, named *Abraham Billod*; and such was the discipline exerted by this pedagogue, that the accidental sight of him, at any future period of life, excited in Haller very great uneasiness, and renewed all his former terrors.

According to the accounts which are given us, the progress of Haller's studies, at the earliest periods of life, was rapid almost beyond belief. When other children were beginning only to read, he was studying Bayle and Moreri; and at nine years of age he was able to translate Greek, and was beginning the study of Hebrew. Not long after this, however, the course of his education was somewhat interrupted by the death of his father; an event which happened when he was in the 13th year of his age. After this he was sent to the public school at Bern, where he exhibited many specimens of early and uncommon genius. He was distinguished for his knowledge in the Greek and Latin languages; but he was chiefly remarkable for his poetical genius: and his essays of this kind, which were published in the German language, were read and admired throughout the whole empire.

In the 16th year of his age, he began the study of medicine at Tubingen, under those eminent teachers Duvernoy and Camerarius; and continued there for the space of two years, when the great reputation of the justly celebrated Boerhaave drew him to Leyden. Nor was this distinguished teacher the only man from whose superior abilities he had there an opportunity of profiting. Ruych was still alive, and Albinus was rising into fame. Animated by such examples, he spent all the day, and the greatest part of the night, in the most

most intense study; and the proficiency which he made, gained him universal esteem both from his teachers and fellow-students.

From Holland, in the year 1727, he came to England. Here, however, his stay was but short; and it was rather his intention to visit the illustrious men of that period, than to prosecute his studies at London. He formed connexions with some of the most eminent of them. He was honoured with the friendship of Douglas and Chefelden; and he met with a reception proportioned to his merit from Sir Hans Sloane, president of the Royal Society. After his visit to Britain, he went to France; and there, under those eminent masters, Winslow and Le Drain, with the latter of whom he resided during his stay in Paris, he had opportunities of prosecuting anatomy, which he had not before enjoyed. But the zeal of our young anatomist was greater than the prejudices of the people at that period, even in the enlightened city of Paris, could admit of. An information being lodged against him to the police for dissecting dead bodies, he was obliged to cut short his anatomical investigations by a precipitate retreat. Still, however, intent on the farther prosecution of his studies, he went to Basil, where he became a pupil to the celebrated Bernoulli.

Thus improved and instructed by the lectures of the most distinguished teachers of that period, by uncommon natural abilities, and by unremitting industry, he returned to the place of his nativity in the 26th year of his age. Not long after this, he offered himself a candidate, first for the office of physician to an hospital, and afterwards for a professorship. But neither the character which he had before he left his native country, nor the fame which he had acquired and supported while abroad, were sufficient to combat the interest opposed to him. He was disappointed in both; and it was even with difficulty that he obtained, in the following year, the appointment of keeper of a public library at Bern. The exercise of this office was indeed by no means suited to his great abilities: but it was agreeable to him, as it afforded him an opportunity for that extensive reading by which he has been so justly distinguished.

The neglect of his merit which marked his first outset, neither diminished his ardour for medical pursuits, nor detracted from his reputation either at home or abroad. And soon after he was nominated a professor in the university of Gottingen, by king George II. The duties of this important office he discharged, with no less honour to himself than advantage to the public, for the space of seventeen years; and it afforded him an ample field for the exertion of those great talents which he possessed. Extensively acquainted with the sentiments of others respecting the economy of the human body, struck with the diversity of opinions which they held, and sensible that the only means of investigating truth was by careful and candid experiment, he undertook the arduous task of exploring the phenomena of human nature from the original source. In these pursuits he was no less industrious than successful, and there was hardly any function of the body on which his experiments did not reflect either a new or a stronger light. Nor was it long necessary for him, in this arduous undertaking, to labour alone. The example of the preceptor inspired his pupils with the spirit of in-

dustrious exertion. Zinn, Zimmerman, Caldani, and many others, animated by a generous emulation, laboured with indefatigable industry to prosecute and to perfect the discoveries of their great master. And the mutual exertion of the teacher and his students, not only tended to forward the progress of medical science, but placed the philosophy of the human body on a more sure, and an almost entirely new basis.

But the labours of Dr Haller, during his residence at Gottingen, were by no means confined to any one department of science. He was not more anxious to be an improver himself, than to instigate others to similar pursuits. To him, the Anatomical Theatre, the School of Midwifery, the Chirurgical Society, and the Royal Academy of Sciences, at Gottingen, owe their origin. Such distinguished merit could not fail to meet with a suitable reward from the sovereign under whose protection he then taught. The king of Great Britain not only honoured him with every mark of attention which he himself could bestow, but procured him also letters of nobility from the emperor. On the death of Dillenius, he had an offer of the professorship of botany at Oxford; the states of Holland invited him to the chair of the younger Albinus; the king of Prussia was anxious that he should be the successor of Maupertuis at Berlin. Marshal Keith wrote to him in the name of his sovereign, offering him the chancellorship of the university of Halle, vacant by the death of the celebrated Wolff. Count Orlov invited him to Russia, in the name of his mistress the empress, offering him a distinguished place at St Petersburg. The king of Sweden conferred on him an unsolicited honour, by raising him to the rank of knighthood of the order of the polar star; and the emperor of Germany did him the honour of a personal visit, during which he thought it no degradation of his character to pass some time with him in the most familiar conversation.

Thus honoured by sovereigns, revered by men of literature, and esteemed by all Europe, he had it in his power to have held the highest rank in the republic of letters. Yet, declining all the tempting offers which were made to him, he continued at Gottingen, anxiously endeavouring to extend the rising fame of that medical school. But after seventeen years residence in that university, an ill state of health rendering him less fit for the duties of the important office which he held, he solicited and obtained permission from the regency of Hanover to return to his native city of Bern. His fellow-citizens, who might at first have fixed him among themselves, with no less honour than advantage to their city, were now as sensible as others of his superior merit. A pension was settled upon him for life, and he was nominated at different times to fill the most important offices in the state. These occupations, however, did not diminish his ardour for useful improvements. He was the first president, as well as the greatest promoter, of the Oeconomical Society at Bern; and he may be considered as the father and founder of the Orphan-hospital of that city. Declining health, however, restrained his exertions in the more active scenes of life, and for many years he was confined entirely to his own house. Even this, however, could not put a period to his utility: for, with indefatigable industry he continued his favourite employment

Halley.

ployment of writing till within a few days of his death; which happened in the 70th year of his age, on the 12th of December 1777. His *Elementa Physicæ* and *Bibliotheca Medicinæ*, will afford, to latest posterity, undeniable proofs of his indefatigable industry, penetrating genius, and solid judgment. But he was not less distinguished as a philosopher, than beloved as a man; and he was not more eminent for his improvement in every department of medical science, than for his piety to God, and benevolence to all mankind.

HALLEY (Dr Edmund), an eminent astronomer, was the only son of a soap-boiler in London, and was born in 1656. He first applied himself to the study of the languages and sciences, but at length gave himself up wholly to that of astronomy. In 1676 he went to the island of St Helena to complete the catalogue of fixed stars, by the addition of those that lie near the south pole; and having delineated a planisphere, in which he laid them all down in their exact places, he returned to England in 1678. In the year 1680 he took what is called the *grand tour*, accompanied by his friend the celebrated Mr Nelson. In the mid-way between Calais and Paris, Mr Halley had a sight of a remarkable comet, as it then appeared a second time that year, in its return from the sun. He had the November before seen it in its descent; and now hastened to complete his observations upon it, in viewing it from the royal observatory of France. His design in this part of his tour was, to settle a friendly correspondence between the two royal astronomers of Greenwich and Paris, and in the mean time to improve himself under so great a master as Cassini. From thence he went to Italy, where he spent great part of the year 1681; but his affairs calling him home, he returned to England. In 1683, he published his *Theory of the variation of the magnetical compass*; in which he supposes the whole globe of the earth to be a great magnet, with four magnetical poles, or points of attraction: but afterwards thinking that this theory was liable to great exceptions, he procured an application to be made to king William, who appointed him commander of the Paramour pink, with orders to seek by observations the discovery of the rule of variations, and to lay down the longitudes and latitudes of his majesty's settlements in America.—He set out on this attempt on the 24th of November 1698: but having crossed the line, his men grew sickly; and his lieutenant mutinying, he returned home in June 1699. Having got the lieutenant tried and cashiered, he set sail a second time in September following, with the same ship, and another of less bulk, of which he had also the command. He now traversed the vast Atlantic ocean from one hemisphere to the other, as far as the ice would permit him to go; and having made his observations at St Helena, Brazil, Cape Verd, Barbadoes, the Madirras, the Canaries, the coast of Barbary, and many other latitudes, arrived in September 1700; and the next year published a general chart, shewing at one view the variation of the compass in all those places. Captain Halley, as he was now called, had been at home little more than half a year, when he was sent by the king to observe the course of the tides, with the longitude and latitude of the principal head-lands in the British channel; which having executed with his usual expedition and accu-

cy, he published a large map of the British channel. Soon after, the emperor of Germany resolving to make a convenient harbour for shipping in the Adriatic, Captain Halley was sent by queen Anne to view the two ports on the coast of Dalmatia. He embarked on the 22d of November 1702; passed over to Holland; and going through Germany to Vienna, he proceeded to Istria: but the Dutch opposing the design, it was laid aside; yet the emperor made him a present of a rich diamond-ring from his finger, and honoured him with a letter of recommendation, written with his own hand, to queen Anne. Presently after his return, he was sent again on the same business; when passing thro' Hanover, he supped with king George I. then electoral prince, and his sister the queen of Prussia. On his arrival at Vienna, he was the same evening presented to the emperor, who sent his chief engineer to attend him to Istria, where they repaired and added new fortifications to those of Trieste.

Mr Halley returned to England in 1703; and the same year was made professor of geometry in the university of Oxford, in the room of Dr Wallis, and had the degree of doctor of laws conferred on him by that university. He is said to have lost the professorship of astronomy in that city, because he would not profess his belief of the Christian religion. He was scarcely settled at Oxford, when he began to translate into Latin from the Arabic, *Apollonius de sectione rationis*; and to restore the two books *De sectione spatii* of the same author, which are lost, from the account given of them by Pappius; and he published the whole work in 1706. Afterwards he had a share in preparing for the press Apollonius's Conics; and ventured to supply the whole eighth book, the original of which is also lost. He likewise added Serenus on the section of the cylinder and cone, printed from the original Greek, with a Latin translation, and published the whole in folio. In 1713, he was made secretary of the Royal Society; in 1720, he was appointed the king's astronomer at the royal observatory at Greenwich, in the room of Mr Flamsteed; and, in 1729, was chosen as a foreign member of the Academy of Sciences at Paris. He died at Greenwich in 1742. His principal works are, 1. *Catalogus stellarum australium*. 2. *Tabule astronomice*. 3. An abridgment of the astronomy of comets, &c. We are also indebted to him for the publication of several of the works of the great Sir Isaac Newton, who had a particular friendship for him, and to whom he frequently communicated his discoveries.

HALLEY'S *Squadrant*. See *QUADRANT*.

HALLIARDS, the ropes or tackles usually employed to hoist or lower any sail upon its respective mast or stay. See *JEARS*.

HALMOTÉ, or HALIMOTÉ, is the same with what we now call a *court-baron*, the word implying a meeting of the tenants of the same hall or manor. The name is still retained at Luffton, and other places in Herefordshire. See *MORE*.

HALMSTADT. See *HELMSTADT*.

HALSTEAD, town of Essex, in England, seated on the river Coln, in E. Lon. o. 45. N. Lat; 51. 55. It has an old church, the steeple of which was once burnt down by lightning, but rebuilt at the expence of an individual, (Robert Filke, esq;).

THE
town

Halley
||
Hallstead.

Halo

Ham.

town consists of about 600 pretty good houses, and is situated on a rising ground, but the streets are not paved. The inhabitants are about 4000 in number. Here is a good manufactory of says, bays, callimancoes, &c. also a good free-school for 40 boys, and a very antique Bridewell.

HALO, or CORONA, in natural history, a coloured circle appearing round the body of the sun, moon; or any of the large stars. See CORONA.

HALT, in war, a pause or stop in the march of a military body.—Some derive the word from the Latin *haltus*, breath; it being a frequent occasion of halting to take breath: others from *alto*, because in halting they raised their pikes on end, &c.

HALTERISTÆ, in antiquity, a kind of players called *discus*; denominated from a peculiar kind of *discus* used by the Greeks *κάντις*, and by the Latins *Halter*. See DISCUS.

Some take the *discus* to have been a leaden weight or ball which the vaulters bore in their hands, to secure and keep themselves the more steady in their leaping. Others will have the *halter* to be a lump or mass of lead or stone, with an hold or handle fixed to it, by which it might be carried; and that the *halteristæ* were those who exercised themselves in removing these masses from place to place.

Hier. Mercurialis, in his treatise *De arte gymnastica*, l. iii. c. 12. distinguishes two kinds of *halteristæ*; for though there was but one *halter*, there were two ways of applying it. The one was to throw or pitch it in a certain manner; the other only to hold it out at arm's-end, and in this posture to give themselves divers motions, swinging the hand backwards and forwards, according to the engraven figures thereof given us by Mercurialis.—The *halter* was of a cylindrical figure, smaller in the middle, where it was held, by one diameter, than at the two ends. It was above a foot long, and there was one for each hand: it was either of iron, stone, or lead.

Galen, *De tuend. valetud.* lib. i. v. & vi. speaks of this exercise, and shews of what use it is in purging the body of peccant humours; making it equivalent both to purgation and phlebotomy.

HALTWHISTLE, a town of Northumberland, in England, situated in E. Lon. 2. 02 N. Lat. 55. 0. It is pretty well built, and affords good entertainment for travellers.

HALYMOTE, properly signifies an holy or ecclesiastical court. See HALMOTE.

There is a court held in London by this name before the Lord-Mayor and sheriffs, for regulating the bakers. It was anciently held on Sunday next before St Thomas's day, and for this reason called the *Halymote*, or *Holy-court*.

HALYWERCFOLK, in old writers, were persons who enjoyed land, by the pious service of repairing some church, or defending a sepulchre.

This word also signified such persons in the diocese of Durham, as held their lands to defend the corps of St Cuthbert, and who from thence claimed the privilege of not being forced to go out of the bishopric.

HAM is a Saxon word used for "a place of dwelling;" a village or town; hence the termination of some of our towns, *Nottingham, Buckingham, &c.*

VOL. V.

Also a home close, or little narrow meadow, is called a *ham*.

HAM, in cookery, the leg of a hog, seasoned and dried.

To salt a ham in imitation of those of Westphalia: Let the ham be of young pork; sprinkle it with salt for one day, that it may fetch out the blood; then wipe it dry, and rub it with the following mixture: Take a pound of brown sugar, half a pound of salt-petre, half a pint of bay-falt, and three pints of common falt; stir these together in an iron-pan over the fire till they are pretty hot, and then rub the leg of pork with it: let it lie three weeks in this salting, frequently turning it, and then dry it in a chimney.

HAM, a city of Germany, in the circle of Westphalia, capital of the county of Mark, and subject to the king of Prussia. It is seated on the river Lippe, on the frontiers of Munster. The adjacent country abounds in corn, hemp, and flax; and the inhabitants get a good deal of money by travellers. It was formerly a hanse-town, but is now reduced. E. Lon. 7. 53. N. Lat. 51. 42.

HAM, a town of Picardy, in France, seated on the river Somme, among marshes. It has three parishes, and there is here a round tower whose walls are 36 feet thick. It was taken by the Spaniards in 1557, but restored by treaty. E. Lon. 3. 9. N. Lat. 49. 45.

HAMADAN. See AMADAN.

HAMADRYADS, in Heathen theology, certain rural deities; being nymphs of the woods, whose fate depended upon certain trees, together with which they were supposed both to be born and to die.

HAMAH, a town of Turkey in Asia, in Syria, situated in E. Lon. 36. 15. N. Lat. 35. 15. By some travellers it is corruptly called *Amarl* and *Amant*. Some mistake it for the ancient Apamea; but this is now called *Afamiyah*, and is situated a day's journey from Hamah. Hamah is situated among hills, and has a castle seated on a hill. It has all along been a considerable place, and in the 13th century had princes of its own. It is very large, and being seated on the ascent of a hill, the houses rise above one another, and make a fine appearance. It is, however, like most other towns under the Turkish government, going to decay. Many of the houses are half ruined; but those which are still standing, as well as the mosques and castle, have their walls built of black and white stones, disposed in such manner as to form various figures. The river Asi, the ancient Orontes, runs by the side of the castle, and fills the ditches round it, which are cut very deep into the rock. This river, leaving the castle, passes through the town from south to north, and has a bridge over it, though it is pretty broad. In its course through the town it turns 18 great wheels, called by the natives *saki*, which raise great quantities of water to a considerable height, and throw it into canals supported by arches, by which means it is conveyed into the gardens and fountains. There are some pretty good bazars or market-places in Hamah, where there is a trade for linen, which is manufactured there, and sent to Tripoli to be exported into Europe.

HAMAMELIS, WITCH HAZEL; a genus of the digynia order, belonging to the tetrandria class of plants. There is but one species, a native of Virgi-

20 B

nia

Ham

Hamamelis.

Hambden,
Hamburg.

nia. It hath a shrubby or woody stem, branching three or four feet high; oval, indented, alternate leaves, resembling those of common hazel; and flowers growing in clusters from the joints of the young branches, but not succeeded by seeds in this country.—The plant is hardy, and is admitted as a variety in our gardens; but its flowers are more remarkable for their appearing in November and December, when the leaves are fallen, than for their beauty.—It may be propagated either by seeds or layers.

HAMBDEN (John), a celebrated patriot, descended of the ancient family of Hambden in Buckinghamshire, was born in 1594. From the university he went to the inns of court, where he made a considerable progress in the study of the law. He was chosen to serve in the parliament which began at Westminster February 5th 1626; and served in all the succeeding parliaments in the reign of Charles I. In 1636 he became universally known, by his refusal to pay ship-money, as being an illegal tax; upon which he was prosecuted, and his carriage throughout this transaction gained him a great character. When the long parliament began, the eyes of all men were fixed on him as their *pater patriæ*. On January 3d 1642, the king ordered articles of high treason and other misdemeanours to be prepared against Lord Kimbolton, Mr Hambden, and four other members of the House of Commons, and went to that house to seize them: but they were then retired. Mr Hambden afterwards made a speech in the house to clear himself of the charge laid against him. In the beginning of the wars he commanded a regiment of foot, and did good service to the parliament at the battle of Edge-hill. He received a mortal wound in an engagement with Prince Rupert, in Chalgrave-field in Oxfordshire, and died in 1643. He is said to have had the air of Socrates to a great degree, of interrogating, and, under the notion of doubts, insinuating objections, so that he infused his own opinions into those from whom he pretended to learn and receive them. He was, say his panegyrista, a very wise man, and of great parts; and possessed of the most absolute spirit of popularity to govern the people, that ever was in any country: He was master over all his appetites and passions, and had thereby a very great ascendancy over other men's: He was of an industry and vigilance never to be tired out, of parts not to be imposed upon by the most subtle, and of courage equal to his best parts.

HAMBURG, an imperial city of Germany, seated in E. Lon. 9. 40. N. Lat. 54. 0. Its name is derived from the old German word *Hamme*, signifying a wood, and *Burg*, a castle; and stands on the north-side of the river Elbe. This river is not less than four miles broad opposite the city. It forms two spacious harbours, and likewise runs through most part of it in canals. It flows above Hamburg many miles; but when the tide is accompanied with north-west winds, a great deal of damage is done by the inundations occasioned thereby. There are a great many bridges over the canals, which are mostly on a level with the streets, and some of them have houses on both sides. In the year 833, Ludovicus Pius erected Hamburg first into a bishopric, and afterwards into an archbishopric; and Adolphus III. duke of Saxony, among

many other great privileges, granted it the right of Hamburg-fishing in the Elbe, eight miles above and below the city. The kings of Denmark, since they have succeeded to the counts of Holstein, have continually claimed the sovereignty of this place, and often compelled the citizens to pay large sums to purchase the confirmation of their liberties. Nay, it has more than once paid homage to the king of Denmark; who, notwithstanding, keeps a minister here with credentials, which is a sort of acknowledgment of its independency and sovereignty. Though Hamburg has been constantly summoned to the diet of the empire ever since the year 1618, when it was declared a free imperial city, by a decree of the aulic council; yet it waxes this privilege, in order to keep fair with Denmark. The emperor several other emperors, and the privilege is now exercised silver money; and the emperor Frederic I. exempted the citizens from paying any tolls on the Elbe. By their situation among a number of poor princes, the Hamburgers are continually exposed to their rapaciousness, especially that of the Danes, who have extorted vast sums from them. The city is very populous, in proportion to its bulk; for though one may walk with ease round the ramparts in two hours, yet it contains, exclusive of Jews, at least 100,000 inhabitants. Here are a great many charitable foundations, the regulations of which are greatly admired by foreigners. All persons found begging in the streets are committed to the house of correction to hard labour, such as the rasing of Brazil and other kinds of wood. There is an hospital into which unmarried women may be admitted for a small sum, and comfortably maintained during the residue of their lives. The number of hospitals in this place is greater in proportion to its bigness, than in any other Protestant city in Europe. The revenue of the orphan-house alone is said to amount to between 50 and 60,000 l. There is a large sumptuous hospital for receiving poor travellers that fall sick. In one of their work-houses or houses of correction, those who have not performed their task are hoisted up in a basket over the table in the common-hall while the rest are at dinner, that they may be tantalized with the sight and smell of what they cannot taste. The established religion of Hamburg is Lutheranism; as for the Calvinists and the Roman-catholics, they go to the ambassadors chapels to celebrate their divine service and worship. They have here what they call a *private confession*, previous to the holy communion, which differs in nothing from that of the church of England, and the absolution is the same, only the poorest of the people here are forced to give a fee to the priest on these occasions. Their churches, which are ancient large fabrics, are open thoroughfares, and in some of them there are book-sellers shops. The pulpit of St Catharine's is of marble, curiously carved and adorned with figures and other ornaments of gold; and its organ, reckoned one of the best in Europe, has 6000 pipes. The cathedral is very ancient, and its tower leans as if just going to fall; yet, on account of the singularity and beauty of its architecture, the danger attending it has been hitherto overlooked. There is still a dean and chapter belonging to this church; though secularized; from whose court there lies no appeal, but to the imperial chamber

Hamburg.

chamber at Wetzlar. The chapter consists of a provost, dean, 13 canons, eight minor canons, and 30 *vicarii immunes*, besides others who are under the jurisdiction of the city. The cathedral, with the chapter, and a number of houses belonging to them, are under the immediate protection of his Britannic majesty as duke of Bremen, who disposes of the prebends that fall in six months of the year, not successively, but alternately with the chapter. Hamburg is almost of a circular form, and six miles in compass. It has six gates, and three entrances by water, viz. two from the Elbe and one from the Alster, being divided into the old and new; which are strongly fortified with moats, ramparts, bastions, and out-works. The ramparts are very lofty, and planted with trees; and of such a breadth, that several carriages may go a-breast. In the new town, towards Altena, are several streets of mean houses inhabited by Jews. Through that entrance from the Elbe called the *lower Basin*, pass all ships going to or coming from sea. Every morning at the opening of it is seen a multitude of boats and small barks, whose cargoes consist of milk, fruits, and all kinds of provisions, rushing in at the same time. There are some fine chimneys here, especially those of St Nicholas, which play every morning early, at one o'clock in the afternoon, and on all festivals and solemnities. The other public structures in this city, besides the churches, make no great appearance: however, the yard, arsenal, and two armories, are well worth seeing. There are several convents or cloisters still remaining; which having been secularized, are now possessed by the Lutherans. One of them holds its lands by this tenure, "That they offer a glass of wine to every malefactor who is carried by it for execution." There is a fine exchange, though inferior to that of London. It is the custom of Hamburg, that a citizen, when he dies, must leave the tenth of his estate to the city; and foreigners, not naturalized, must pay a certain sum annually for liberty to trade. The common carts here are only a long pulley laid upon an axle-tree between two wheels, and drawn not by horses, but by men, of whom a dozen or more are sometimes linked to these machines, with flings across their shoulders. Such of the senators, principal elders, divines, regular physicians, and graduates in law, as assist at funerals, have a fee. The hangman's house is the common prison for all malefactors; on whom sentence is always passed on Friday, and on Monday they are executed. As, by their laws, no criminal is punishable unless he plead guilty, they have five different kinds of torture to extort such confession. The government of this city is lodged in the senate and three colleges of burghers. The former is vested with almost every act of sovereignty, except that of laying taxes and managing the finances, which are the prerogatives of the latter. The magistracy is composed of four burgo-masters, four syndics, and 24 aldermen, of whom some are lawyers and some merchants. Any person elected into the magistracy, and declining the office, must depart the place. No burgher is admitted into any of the colleges, unless he dwells in a house of his own within the city, and is possessed of 1000 rix-dollars in specie, over and above the sum for which the house may be mortgaged; or 2000 in moveable goods, within the jurisdiction of the same. For the admini-

Hamburg.

stration of justice, here are several inferior courts, from which an appeal lies to the Obergericht, or high court, and from that to the aulic council and other imperial colleges. For naval causes here is a court of admiralty, which, jointly with the city-treasury, is also charged with the care of the navigation of the Elbe, from the city to the river's mouth. In consequence of this, 100 large buoys, some white, others black, are kept constantly floating in the river in summer; but in winter, instead of some of them, there are machines, like those called *ice-beacons*, to point out the shoals and flats. Subordinate to the admiralty is a company of pilots; and at the mouth of the Elbe is, or at least ought to be, a vessel always riding, with pilots ready to put on board the ships. At the mouth of the river also is a good harbour, called *Cuxhaven*, belonging to Hamburg; a light-house; and several beacons, some of them very large. For defraying the expence of these, certain tolls and duties were formerly granted by the emperors to the city. Besides the Elbe, there is a canal by which a communication is opened with the Trave, and thereby with Lubeck and the Baltic, without the hazard, trouble, and expence of going about by the Sound. The trade of Hamburg is exceeding great, in exporting all the commodities and manufactures of the several cities and states of Germany, and supplying them with whatever they want from abroad. Its exports consist of linens of several sorts and countries; as lawns, diapers, Onaburgs, dowlas, &c. linen-yarn, tin-plates, iron, brass and steel wire, clap-board, pipe-staves, waincot-boards, oak-plank and timber, kid-skins, corn, beer in great quantities, with flax, honey, wax, aniseed, linseed, drugs, wine, tobacco, and metals. Its principal imports are the woollen manufactures and other goods of Great Britain, to the amount of several hundred thousand pounds a-year: they have also a great trade with Spain, Portugal, and Italy, which is carried on mostly in English bottoms, on account of their Mediterranean passes. Their whale-fishery is also very considerable, 50 or 60 ships being generally sent out every year in this trade. Add to these a variety of manufactures, which are performed here with great success; the chief of which are, sugar-baking, calico-printing, the weaving of damasks, brocades, velvets, and other rich silks. The inland trade of Hamburg is superior to that of any in Europe, unless perhaps we should except that of Amsterdam and London. There is a paper published here at stated times, called the *Preis-Courant*, specifying the course of exchange, with the price which every commodity and merchandise bore last upon the exchange. There is also a board of trade, erected on purpose for the advancing every project for the improvement of commerce. Another great advantage to the merchants is, the bank established in 1619, which has a flourishing credit. To supply the poor with corn at a low price, here are public granaries, in which great quantities of grain are laid up. By charters from several emperors, the Hamburgers have a right of coinage, which they actually exercise. The English merchants, or *Hamburg company*, as it is called, enjoy great privileges; for they hold a court with particular powers, and a jurisdiction among themselves, and have a church and minister of their own.—This city has a district belonging to it of considerable extent, which abounds with excellent pa-

Hamburg
Hamilton.

flures, intermixed with several large villages and noblemens seats. A small bailiwick, called *Bergedorf*, belongs to this city and Lubeck.—Though Hamburg has an undoubted right to a seat in the diet of the empire, yet as she pays no contributions to the military chest in time of war, and is also unwilling to draw upon herself the resentment of Denmark, she makes no use of that privilege. There is a *schola illustis* or gymnasium here, well endowed, with fix able professors, who read lectures in it as at the universities. There are also several free schools, and a great number of libraries, public and private. The public cellar of this town has always a prodigious stock and vent of old hock, which brings in a considerable revenue to the state. Besides the militia, or trained bands, there is an establishment of regular forces, consisting of 12 companies of infantry, and one troop of dragoons, under the commandant, who is usually a foreigner, and one who has distinguished himself in the service. There is also an artillery company, and a night-guard; the last of which is posted at night all over the city, and calls the hours.

HAMEL (John Baptiste du), a very learned French philosopher and writer in the 17th century. At 18 he wrote a treatise, in which he explained in a very simple manner, Theodosius's three books of Spherics; to which he added a tract upon trigonometry, extremely periphrastic, and designed as an introduction to astronomy. Natural philosophy, as it was then taught, was only a collection of vague, knotty, and barren questions; when our author undertook to establish it upon right principles, and published his *Astronomia Physica*. In 1666 Mr Colbert proposed to Lewis XIV. a scheme, which was approved of by his majesty, for establishing a royal academy of sciences; and appointed our author secretary of it. He published a great many books; and died at Paris in 1706, of mere old age, being almost 83. He was regius professor of philosophy, in which post he was succeeded by M. Varignon. He wrote Latin with purity and elegance.

HAMELIN, a strong town of Germany, in the duchy of Calemberg in Lower Saxony. It is situated at the extremity of the duchy of Brunswick, to which it is the key, near the confluence of the rivers Hamel and Weser, in E. Long. 9. 55. N. Lat. 52. 13.

HAMESECKEN. BURGLARY, or *Nothurnal House-breaking*, was by the ancient English law called *Hame-secken*, as it is in Scotland to this day.—Violating the privilege of a man's house in Scotland is as severely punished as ravishing a woman.

HAMILTON, a town of Scotland, in Clydesdale, seated on the river Clyde, eleven miles south-east of Glasgow; from whence the noble family of Hamilton take their name, and title of duke. The town is seated in the middle of a very agreeable plain; and on the west of the town this family has a large park, which is near seven miles in circumference, inclosed with a high wall, full of deer and other game. The rivulet called *Avon* runs through the park, and falls into the river Clyde, over which last there is a bridge of free-stone. W. Lon. 3. 50. N. Lat. 55. 40. The original name of this place, or the lands about it, was *Cadzow* or *Cadyow*, a barony granted to an ancestor of the noble owner, on the following oc-

Hamilton

caſion. In the time of Edward II. lived *Sir Gilbert de Hamilton*, or *Hampton*, an Englishman of rank; who happening at court to speak in praise of Robert Bruce, received on the occasion an insult from John de Spenser, chamberlain to the king; whom he fought and slew. Dreading the resentment of that potent family, he fled to the Scottish monarch; who received him with open arms, and established him at the place possessed by the duke of Hamilton. In after-times the name was changed from *Cadzow* to *Hamilton*; and in 1445 the lands were erected into a lordship, and the then owner Sir James sat in parliament as lord Hamilton. The same nobleman founded the collegiate church at Hamilton in 1451, for a provost and several prebendaries. The endowment was ratified at Rome by the pope's bull, which he went in person to procure.—Hamilton-house, or palace, is at the end of the town; a large disagreeable pile, with two deep wings at right angles with the centre: the gallery is of great extent; and furnished, as well as some other rooms, with most excellent paintings.

HAMILTON (Anthony, count), descended from a noble family in Scotland, was born in Ireland, and settled in France. He wrote several poetical pieces; and was the first who composed romances in an agreeable taste, without imitating the burlesque of Scarron. He is also said to be the author of the *Memoirs of the count de Grammont*, one of the best written pieces in the French language. His works were printed in 6 vols 12mo. He died at St Germain-en-Laye, in 1720.

HAMILTON (George), earl of Orkney, and a brave warrior, was the fifth son of William earl of Selkirk, and early betook himself to the profession of arms. Being made colonel in 1689-90, he distinguished himself by his bravery at the battle of the Boyne; and soon after, at those of Aghrim, Steinkirk, and Landen, and at the sieges of Athlone, Limerick, and Namur. His eminent services in Ireland and Flanders, through the whole course of that war, recommended him so highly to king William III. that, in 1696, he advanced him to the dignity of a peer of Scotland, by the title of *earl of Orkney*; and his lady, the sister of Edward viscount Wiltshire, afterwards earl of Jersey, had a grant made to her, under the great seal of Ireland, of almost all the private estates of the late king James, of very considerable value.

Upon the accession of queen Anne to the throne, he was promoted to the rank of major-general in 1702, and the next year to that of lieutenant-general, and was likewise made knight of the thistle. His lordship afterwards served under the great duke of Marlborough; and contributed by his bravery and conduct to the glorious victories of Blenheim and Malplaquet, and to the taking several of the towns in Flanders.

In the beginning of 1710, his lordship, as one of the 16 peers of Scotland, voted for the impeachment of Dr Sacheverel; and the same year was sworn of the privy-council, and made general of the foot in Flanders. In 1712, he was made colonel of the royal regiment of fusiliers, and served in Flanders under the duke of Ormond. In 1714, he was appointed gentleman-extraordinary of the bed chamber to king George I. and afterwards governor of Virginia. A2
length

Hamlet
Hammond.

length he was appointed constable, governor, and captain of Edinburgh castle, lord lieutenant of the county of Clydesdale, and field-marshal. He died at his house in Albemarle-street, in 1737.

HAMLET, HAMEL, or Hampfel, (from the Saxon *Ham*, i. e. *Donus*, and the German *Let*, i. e. *Membrum*), signifies a little village, or part of a village or parish; of which three words the first is now only used, tho' Kitchen mentions the two last. By Spelman there is a difference between *villam integram*, *villam dimidiam*, and *hamletum*; and Stowe expounds it to be the seat of a freeholder. Several county-towns have hamlets, as there may be several hamlets in a parish; and some particular places may be out of a town or hamlet, though not out of the county.

HAMMOCK, on shipboard, a piece of canvas six feet long and three feet wide, gathered together at the two ends, and hung horizontally under the deck lengthwise, for the sailors to sleep therein. There are usually from 14 to 20 inches in breadth allowed between-decks for every hammock in a ship of war: this space, however, must in some measure depend on the number of the crew, &c. in proportion to the room of the vessel. In the time of battle the hammocks, together with their bedding, are all firmly corded, and fixed in the nettings on the quarter-deck, or wherever the men are too much exposed to the view or fire of the enemy.

HAMMER, a well-known tool used by mechanics, consisting of an iron-head, fixed crosswise upon a handle of wood. There are several sorts of hammers used by blacksmiths; as, 1. The hand-hammer, which is of such weight that it may be wielded or governed with one hand at the anvil. 2. The up-hand sledge, used with both hands, and seldom lifted above the head. 3. The about-sledge, which is the biggest hammer of all, and held by both hands at the farthest end of the handle; and being swung at arms-length over the head, is made to fall upon the work with as heavy a blow as possible. There is also another hammer used by smiths, called a *rivetting-hammer*; which is the smallest of all, and is seldom used at the forge, unless upon small work.—Carpenters and joiners have likewise hammers accommodated to their several purposes.

HAMMOND (Henry), D. D. one of the most learned English divines in the 17th century, was born in 1605. He studied at Oxford, and in 1629 entered into holy orders. In 1633 he was inducted into the rectory of Penshurst in Kent. In 1643 he was made archdeacon of Chichester. In the beginning of 1645 he was made one of the canons of Christ-church, Oxford, and chaplain in ordinary to king Charles I. who was then in that city; and he was also chosen public orator of the university. In 1647, he attended the king in his confinement at Woodrow, Cavesham, Hampton-Court, and the Isle of Wight, where he continued till his majesty's attendants were again put from him. He then returned to Oxford, where he was chosen sub-dean; and continued there till the parliament visitors first ejected him, and then imprisoned him for several weeks in a private house in Oxford. During this confinement he began his Annotations on the New Testament. At the opening of the year 1660, when every thing wisely tended to the restora-

tion of the royal family, the doctor was desired by the bishops to repair to London, to assist there in the composition of the breaches of the church, his station in which was designed to be the bishopric of Worcester; but on the 4th of April he was seized by a fit of the stone, of which he died on the 25th of that month, aged 55. Besides the above work, he wrote many others; all of which have been published together in four volumes folio.

HAMMOND (Anthony, esq;) an ingenious English poet, descended from a good family of Somersham Place in Huntingdonshire, was born in 1608. After a liberal education at St John's college, Cambridge, he was chosen member of parliament, and soon distinguished himself as a fine speaker. He became a commissioner of the royal navy, which place he quitted in 1712. He published "A miscellany of original poems by the most eminent hands," in which himself, as appears by the poems marked with his own name, had no inconsiderable share. He wrote the life of Walter Moyle, esq; prefixed to his works. He was the intimate friend of that gentleman, and died about the year 1726.

HAMMOND (Mr.), known to the world by the *Love-Elegies*, which, some years after his death, were published by the earl of Chesterfield, was the son of a merchant in London, and preferred to a place about the person of the late prince of Wales, which he held till an unfortunate accident deprived him of his senses. The cause of this calamity was a passion he entertained for a lady, who would not return it: upon which he wrote those love-elegies which have been so much celebrated for their tenderness. The editor observes, that he composed them before he was 21 years of age: a period, says he, when fancy and imagination commonly riot at the expense of judgment and correctness. He was sincere in his love as in his friendship; and wrote to his mistress as he spoke to his friends, nothing but the genuine sentiments of his heart. Tibullus seems to have been the model our author judiciously preferred to Ovid; the former writing directly from the heart to the heart, the latter too often yielding and addressing himself to the imagination. Mr Hammond died in the year 1743, at Stow, the seat of lord Cobham, who honoured him with a particular intimacy.

HAMPSHIRE, a county of England, bounded on the west by Dorsetshire and Wiltshire, on the north by Berkshire, on the east by Surrey and Sussex, and on the south by the English channel. It extends 64 miles in length from north to south, and 36 in breadth from east to west. It is divided into 39 hundreds, and 253 parishes; in which are one city, 18 market-towns, and about 180,000 inhabitants. It sends 26 members to parliament; viz. two for the county, two for the city of Winchester the capital, and two for each of the following boroughs, Southampton, Portsmouth, Yarmouth, Petersfield, Newport, Stockbridge, Newton, Christchurch, Lymington, Whitchurch, and Andover.—The air is very pure and pleasant, especially upon the downs, on which vast flocks of sheep are kept and bred. In the champaign part of the county, where it is free of wood, the soil is very fertile, producing all kinds of grain. The county is extremely well wooded and watered; for besides many woods on private estates,

Hammond's
Hamphire.

Hampshire
Hampton.

flates, in which there are vast quantities of well-grown timber, there is the new forest of great extent, belonging to the crown, well stored with venerable oaks. In these woods and forests, great numbers of hogs run at large, and feed on the acorns; and hence it is that the Hampshire bacon so far excels that of most other countries. The rivers are the Avon, Anton, Arle, Test, Stowre, and Itchin; besides several smaller streams, all abounding in fish, especially trout. As its sea-coast is of a considerable extent, it possesses many good ports and harbours, and is well supplied with salt-water fish. Much honey is produced in the county, and a great deal of mead and metheglin made. Here is also plenty of game, and on the downs is most delightful hunting. The manufacture of cloth and kerseys in this county, though not so extensive as that of some others, is yet far from being inconsiderable, and employs great numbers of the poor, as well as contributes to the enriching of the manufacturers by what is sent abroad.

NEW HAMPSHIRE, a province of North America, in New England. It is bounded on the north by Nova Scotia, on the east by the Ocean, on the south by Massachusetts's bay, and on the west by New-York. Before the commencement of the American war, it was ruled by a governor and council appointed by the king, and a house of representatives. As it is a very proper country for furnishing naval stores, great part of its timber was appointed for masts and yards to the royal navy.

HAMPSTEAD, a pleasant village of Middlesex, five miles north of London. As the air is exceeding good, the place is well furnished with fine seats built in an elegant manner, and much resorted to in the summer-time by all sorts of people. As for the medicinal waters formerly in request, they are now much neglected. In Henry VIII's time it was chiefly inhabited by laundresses, who washed for the Londoners.

HAMPTON, a town of Gloucestershire in England, seated on the Cotswold hills, and had formerly a nunnery. W. Long. 2. 15. N. Lat. 51. 38.

HAMPTON-Court, a town of Middlesex in England, seated on the river Thames, 12 miles west of London, and two from Kingstown. It is chiefly famous for the royal palace there, which is the finest in Britain. It was built by cardinal Wolsey, who had 280 silk beds for strangers only, and furnished it richly with gold and silver plate. The buildings, gardens, and the two parks, to which William III. made considerable additions, are about four miles in circumference, and are watered on three sides by the Thames. The inward court, built by king William, forms a piazza, the pillars of which are so low, that it looks more like a cloyster than a palace; however, the apartments make ample amends, being extremely magnificent, and more exactly disposed than in any other palace in the world, and adorned with most elegant furniture. Since the accession of his present majesty, however, this palace hath been much neglected, as the king has generally made choice of Richmond for his summer retreat. Those inimitable paintings by Raphael Urbin called the *caroons*, which were placed there by king William, have been removed to the queen's palace at Westminster. For these pieces Lewis XV. is said to have offered 100,000*l*.

Hanau
Handel.

HANAU, a town of Germany, and capital of a county of the same name, is pleasantly situated on the river Kenzig near its confluence with the Mayne. The river divides it into the old and new towns, both of which are fortified. The new town, which was built at first by French and Flemish refugees, who had great privileges granted them, is regular and handsome. The castle in which the counts used to reside, and which stands in the old town, is fortified, and has a fine flower-garden with commodious apartments, but makes no great appearance. The Jews are tolerated here, and dwell in a particular quarter. The magistracy of the new town, and the disposal of all offices in it, belong to the French and Dutch congregations. Here is an university, with several manufactures, particularly of that of roll tobacco, and a very considerable traffic. E. Long. 9. 0. N. Lat. 49. 58.

HANAU-Munzenberg, a county of Germany. The greatest part of it is surrounded by the electorate of Mentz, the bishopric of Fulda, the lordships of Reineck, Isenburg, and Solms; as also by the territories of Hesse-Homburg, Burg-Friedburg, and Frankfurt. Its length is near 40 miles, but its greatest breadth not above 12. It is exceeding fertile in corn, wine, and fruits; yielding also salt springs, with some copper, silver, and cobalt. The chief rivers are, the Mayne, the Kinzege, and the Nidda. The prevailing religion is Calvinism, but Lutherans and Catholics are tolerated. The country is populous, and trade and manufactures flourish in it. In 1736, the whole male line of the counts of Hanau failing in John Reinard, William VIII. landgrave of Hesse Cassel, by virtue of a treaty of mutual succession between the families of Hanau and Hesse Cassel, took possession of the county, satisfaction having been first made to the house of Saxony for their claims; and in the year 1754 transferred it to prince William, eldest son to the then hereditary prince Frederic, afterwards landgrave. The revenues of the last count, arising from this and other territories, are said to have amounted to 500,000 florins. The principal places are Hanau, Bergen, Steinau, and Glenhausen.

HAND, in anatomy, the extreme part of the arm. Anaxagoras is represented by ancient authors, as maintaining, that man owes all his wisdom, knowledge, and superiority over other animals, to the use of his hands.—Galen puts the thing another way: man, according to him, is not the wisest creature because he has hands; but he had hands given him because he was the wisest creature.

HAND, in the manege, a measure of four inches, or of a clenched fist, by which the height of a horse is computed.

HAND-Breadth, a measure of three inches.

HANDEL (George Frederic), a most eminent master and composer of music, was born at Hall, a city of Upper Saxony in Germany. His father was a physician and surgeon of that place, and was upwards of 60 years of age when Handel was born. During his infancy young Handel is said to have amused himself with musical instruments, and to have made considerable progress before he was seven years of age, without any instructions. His propensity for music at last became so strong, that his father, who designed him for the study of the civil law, thought proper to forbid him,

Handel.

him, even at this early period of life, to touch a musical instrument, and would suffer none to remain in his house. Notwithstanding this prohibition, however, Handel found means to get a little clavier privately conveyed to a room in the uppermost story of the house, to which room he constantly stole when the family were asleep; and thus made such advances in his art, as enabled him to play on the harpsichord. He was first taken notice of by the duke of Saxe Weissenfels on the following occasion. His father went to pay a visit to another son by a former wife, who was valet de chambre to the duke, and resided at his court. Young Handel, being then in his seventh year, earnestly desired permission to go along with him; but being refused, he followed the chaise on foot, and overtook it, the carriage being probably retarded by the roughness of the way. His father at first chid him for his disobedience, but at last took him into the chaise along with him. While he was in the duke's court, he still continued to hew the same inclination for music: it was impossible to keep him from harpsichords; and he used sometimes to get into the organ-loft at church, and play after service was over. On one of these occasions, the duke happening to go out later than usual, found something so uncommon in Handel's manner of playing, that he inquired of his valet who it was; and receiving for answer that it was his brother, he desired to see him. This nobleman was so much taken with the musical genius shewn by young Handel, that he persuaded his father to let him follow the bent of his inclination. He made the boy a present; and told him, that if he minded his studies, no encouragement should be wanting.

On his return to Hall, Handel was placed under one Zackaw, the organist of the cathedral church; and our young musician was even then able to supply his master's place in his absence. At nine years of age he began to compose church-services for voices and instruments, and continued to compose one such service every week for three years successively. At the age of 14, he far excelled his master, as he himself owned; and he was sent to Berlin, where he had a relation in some place about the court, on whose care and fidelity his parents could rely. The opera was then in a flourishing condition, being encouraged by the grandfather of the present king of Prussia, and under the direction of many eminent persons from Italy, among whom were Buononcini and Attilio. Buononcini, being of a haughty disposition, treated Handel with contempt; but Attilio behaved to him with great kindness, and he profited much by his instructions. His abilities soon recommended him to the king, who frequently made him presents, and at last proposed to send him into Italy under his own patronage, and to take him under his immediate protection as soon as his studies should be completed. But Handel's parents not thinking proper to submit their child to the caprice of the king, declined the offer; upon which it became necessary for him to return to Hall.

Handel having now obtained ideas in music far exceeding every thing that could be found in Hall, continued there very unwillingly, and it was resolved to send him into Italy: but as the expence of this journey could not then be spared, he went to Hamburg, where the opera was little inferior to that of Berlin. Soon

Handel.

after his arrival in this city, his father died; and his mother being left in narrow circumstances, her son thought it necessary to procure some scholars, and to accept a place in the orchestra, by which means, instead of being a burden, he became a great relief to her.

At this time, the first harpsichord in Hamburg was played by one Kefer, a man who also excelled in composition; but he, having involved himself in some debts, was obliged to abscond. Upon this vacancy, the person who had been used to play the second harpsichord claimed the first by right of succession: but he was opposed by Handel, who founded a claim to the first harpsichord upon his superior abilities. After much dispute, in which all who supported or directed the opera engaged with much vehemence, it was decided in favour of Handel; but this good success had almost cost him his life. His antagonist resented the supposed affront so much, that, as they were coming out of the orchestra together, he made a push at Handel's breast with a sword; which must undoubtedly have killed him, had there not fortunately been a music-book in the bosom of his coat.

Handel, though yet but in his 15th year, became composer to the house; and the success of *Almeria*, his first opera, was so great, that it ran 30 nights without interruption. Within less than a twelvemonth after this, he set two others, called *Florinda* and *Norene*, which were received with the same applause. During his stay here, which was about four or five years, he also composed a considerable number of sonatas, which are now lost. Here his abilities procured him the acquaintance of many persons of note, particularly the prince of Tuscany, brother to John Gaston de Medicis the grand duke. This prince pressed him to go with him to Italy, where he assured him that no convenience should be wanting; but this offer Handel thought proper to decline, being resolved not to give up his independency for any advantage that could be offered him.

In the 19th year of his age, Handel took a journey to Italy on his own bottom; where he was received with the greatest kindness by the prince of Tuscany, and had at all times access to the palace of the grand duke. His Serene Highness was impatient to have something composed by so great a master; and notwithstanding the difference between the style of the Italian music and the German, to which Handel had hitherto been accustomed, he set an opera called *Roderigo*, which pleased so well, that he was rewarded with 100 sequins, and a service of plate. After staying about a year in Florence, he went to Venice, where he is said to have been first discovered at a masquerade. He was playing on a harpsichord in his visor, when Searlatti, a famous performer, cried out, that the person who played could be none but the famous Saxon or the devil. But a story similar to this is reported of many eminent persons whose abilities have been discovered in disguise. Here he composed his opera called *Agrippina*, which was performed 27 nights successively, with the most extravagant applause.

From Venice, our musician proceeded to Rome, where he became acquainted with cardinal Ottoboni and many other dignitaries of the church, by which means he was frequently attacked on account of his religion; but Handel declared he would live and die in the

Handel.

the religion in which he had been educated, whether it was true or false. Here he composed an oratorio called *Resurrection*, and 150 cantatas, besides some sonatas, and other music. Ottoboni also contrived to have a trial of skill between him and Dominici Scarlatti, who was considered as the greatest master on that instrument in Italy. The event is differently reported. Some say that Scarlatti was victorious, and others give the victory to Handel; but when they came to the organ, Scarlatti himself ascribed the superiority to Handel.

From Rome, Handel went to Naples; after which, he paid a second visit to Florence; and at last, having spent six years in Italy, set out for his native country. In his way thither, he was introduced at the court of Hanover with so much advantage by the baron Kilmanseck, that his Electoral Highness offered him a pension of 1500 crowns a-year as an inducement for him to continue there. This generous offer he declined on account of his having promised to visit the court of the Elector Palatine, and likewise to come over to England in compliance with the repeated invitations of the duke of Manchester. The elector, however, being made acquainted with this objection, generously ordered him to be told, that his acceptance of the pension should neither restrain him from his promise nor resolution; but that he should be at full liberty to be absent a year or more if he chose it, and to go wherever he thought fit. Soon after, the place of master of the chapel was bestowed upon Handel; and our musician having visited his mother, who was now extremely old and blind, his old master Zackaw, and staid some time at the court of the Elector Palatine, set out for England, where he arrived in 1710.

At that time operas were a new entertainment in England, and were conducted in a very absurd manner: but Handel soon put them on a better footing; and set a drama called *Rinaldo*, which was performed with uncommon success. Having staid a year in England, he returned to Hanover; but in 1712 he again came over to England; and the peace of Utrecht being concluded a few months afterwards, he composed a grand *Te Deum* and *Gabriel* on the occasion. He now found the nobility very desirous that he should resume the direction of the opera house in the Hay-market; and the queen having added her authority to their solicitations, and conferred on him a pension of L. 200 a-year, he forgot his engagements to the elector of Hanover, and remained in Britain till the death of the queen in 1714. On the arrival of king Geo. I. Handel, conscious of his ill behaviour, durst not appear at court; but he was extricated from his dilemma by the baron Kilmanseck. Having engaged several of the English nobility in his behalf, the baron persuaded the king to a party of pleasure on the water. Handel was apprised of the design, and ordered to prepare some music for the occasion. This he executed with the utmost attention, and on the day appointed it was performed and conducted by himself. The king with pleasure and surprise inquired whose it was, and how the entertainment came to be provided without his knowledge. The baron then produced the delinquent; and asked leave to present him to his Majesty as one too sensible of his fault to attempt an excuse, but sincerely desirous to atone for it. This

intercession was accepted, Handel was restored to favour, his water-music was honoured with the highest approbation, and the king added a pension of L. 200 a-year to that formerly bestowed on him by queen Anne; which he soon after increased to L. 400, on his being appointed to teach the young princesses music.

In the year 1715, Handel composed his opera of *Admetus*; but from that time to the year 1720 he composed only *Teseo* and *Pastor Fido*, Buononcini and Attilio being then composers for the operas. About this time a project was formed by the nobility for erecting a kind of academy at the Hay-market, with a view of securing to themselves a constant supply of operas to be composed by Handel, and performed under his direction. No less than L. 50,000 was subscribed for this scheme, of which the king himself subscribed L. 1000, and it was proposed to continue the undertaking for 14 years. Handel went over to Dresden in order to engage singers, and returned with Senesino and Durisanti. Buononcini and Attilio had still a strong party in their favour, but not equal to that of Handel; and therefore in 1720 he obtained leave to perform his opera of *Radamisso*. The house was so crowded, that many fainted through excessive heat; and forty shillings were offered by some for a seat in the gallery, after having in vain attempted to get one elsewhere. The contention, however, still ran very high between Handel's party and that of the two Italian masters; and at last it was determined that the rivals should be jointly employed in making an opera, in which each should take a distinct act, and he who by the general suffrage was allowed to have given the best proof of his abilities should be put in possession of the house. This opera was called *Muzio Scaevola*, and Handel set the last act. It is said that Handel's superiority was owned even in the overture before it; but when the act came to be performed, there remained no pretence of doubt or dispute. The academy was now therefore firmly established, and Handel conducted it for nine years with great success; but about that time an irreconcilable enmity took place between Handel himself and Senesino. Senesino accused Handel of tyranny, and Handel accused Senesino of rebellion. The merits of the quarrel are not known: the nobility, however, became mediators for some time; and having failed in that good design, they became parties in the quarrel. Handel was resolved to dismiss Senesino, and the nobility seemed also resolved not to permit him to do so. The haughtiness of Handel's temper would not allow him to yield, and the affair ended in the total dissolution of the academy.

Handel now found that his abilities, great as they were, could not support him against the powerful opposition he met with. After the dismissal of Senesino, his audience insensibly dwindled away, and Handel entered into an agreement with Mr Keidegger to carry on operas in conjunction with him. New singers were engaged from Italy; but the offended nobility raised a subscription against him, to carry on operas in the play-house in Lincoln's-Inn fields. Handel bore up four years against this opposition; three in partnership with Keidegger, and one by himself: but though his musical abilities were superior to those of his antagonists, the astonishing powers of the voice of Farinelli, whom the opposite party had engaged, determined the victory

Handel.

Handel. tory against him. At last Handel, having spent all he was worth in a fruitless opposition, thought proper to desist. His disappointment had such an effect upon him, that for some time he was disordered in his understanding, and at the same time his right arm was rendered useless by a stroke of the palsy. In this deplorable situation, it was thought necessary that he should go to the baths of Aix-la-Chapelle; and from them he received such extraordinary and sudden relief, that his cure was looked upon by the nuns as miraculous.

In 1736, Handel again returned to England; and soon after his return his *Alexander's* feast was performed with applause at Covent-Garden. The success and splendor of the Hay-market was by this time so much reduced by repeated mismanagements, that lord Middlesex undertook the direction of it himself, and once more applied to Handel for composition. He accordingly composed two operas called *Farinondo*, and *Alessandro Severo*, for which in 1737 he received L. 1000. In 1738 he received L. 1500 from a single benefit, and nothing seemed wanting to retrieve his affairs, excepting such concessions on his part as his opponents had a right to expect. These concessions, however, he could not be prevailed upon to make; and that he might no longer be under obligations to act as he was directed by others, he refused to enter into any engagements upon subscription. After having tried a few more operas at Covent-Garden without success, he introduced another species of music called *oratorios*, which he thought better suited to the native gravity of an English audience. But as the subjects of these pieces were always taken from sacred history, it was by some thought to be a profanation to set them to music and perform them at a playhouse. In consequence of this prejudice, the oratorios met with very indifferent success; and in 1741 Mr Handel found his affairs in such a bad situation, that he was obliged to quit England, and go to Dublin.

He was received in Ireland in a manner suitable to his great merit; and his performing his oratorio called the *Messiah*, for the benefit of the city-prison, brought him into universal favour. In nine months time he had brought his affairs into a better situation; and on his return to England in 1742, he found the public much more favourably disposed. His oratorios were now performed with great applause: his *Messiah*, which before had been but coldly received, became a favourite performance; and Handel, with a generous humanity, determined to perform it annually for the benefit of the foundling hospital, which at that time was only supported by private benefactions. In 1743, he had a return of his paralytic disorder; and in 1751 became quite blind by a *gutta serena* in his eyes. This last misfortune for some time sunk him into the deepest despondency; but at last he was obliged to acquiesce in his situation, after having without any relief undergone some very painful operations. Finding it now impossible to manage his oratorios alone, he was assisted by Mr Smith, who at his request frequently played for him, and conducted them in his stead; and with this assistance they were continued till within eight days of his death. During the latter part of his life, his mind was often disordered; yet at times it appears to have resumed its full vigour, and he composed several songs, choruses, &c. which from their dates may

Vol. V.

be considered almost as the last sounds of his dying voice. From about October 1758 his health declined very fast; his appetite, which had been remarkably keen, and which he had gratified to a great degree, left him; and he became sensible of the approach of death. On the 6th of April 1759, his last oratorio was performed, at which he was present, and died on the 14th of the same month. On the 20th he was buried by the right reverend Dr Pearce, bishop of Rochester, in Westminster abbey; where, by his own order, and at his own expence, a monument was erected to his memory.

With regard to the character of this most eminent musician, he is universally allowed to have been a great epicure. In his temper he was very haughty, but was seldom or never guilty of mean actions. His pride was uniform; he was not by turns a tyrant and a slave. He appears to have had a most extravagant love for liberty and independence; inasmuch, that he would, for the sake of liberty, do things otherwise the most prejudicial to his own interest. Nay, so far is he said to have carried this principle, that, merely for the sake of preserving his independence, he often refused the highest favours from the ladies; though others ascribe this to a very different cause. Certain it is, that he never shewed the least attachment to the fair sex. He was liberal even when poor, and remembered his former friends when he was rich. His musical powers can perhaps be best expressed by Arbuthnot's reply to Pope, who seriously asked his opinion of him as a musician; "Conceive (said he) the highest you can of his abilities, and they are much beyond any thing you can conceive."

HANDS, in heraldry, are borne in coat-armour dexter and sinister; that is, right and left, expanded or open. These are the most necessary parts of the human body, as they serve to express all actions, and even our very thoughts and designs; thus, joining of hands is an universal token of friendship, and clapping of hands a general mark of applause.

HANGING, a common method of inflicting death on criminals, by suspending them by the neck. Physicians are not agreed as to the manner in which death is brought on by hanging. De Haen hanged three dogs, whom he afterwards opened. In one, nothing remarkable appeared in the lungs. In another, from whom half an ounce of blood was taken from the jugular vein, the dura and pia mater were of the natural appearance; but the lungs were much inflamed. In the third, the meninges were found, and there was no effusion of blood in the ventricles of the brain, but the left lobe of the lungs was turgid with blood. Wepfer, Littraeus, Alberti, Bruhierius, and Boerhaave, affirm that hanged animals die apoplectic. Their arguments for this are chiefly drawn from the livid colour of the face; from the turgescence of the vessels of the brain; the inflammation of the eyes; and from the sparks of fire which those who have survived hanging allege they have seen before their eyes. On the contrary, Bonetus, Petit, Haller, and Lancisi, from observing that death is occasioned by any small body falling into the glottis, have ascribed it to the stoppage of respiration. Others, deeming both these causes ill-founded, have ascribed it to a luxation of the vertebrae of the neck.—De Haen adduces the authority of many eminent au-

Hands,
Hanging.

Hangings
Hannibal.

thors to prove the possibility of recovering hanged persons; and observes, in general, that with bleeding in the jugular vein, and anointing the neck with warm oil, the same remedies are to be employed in this case as for the recovery of drowned people. See DROWNING.

HANGINGS, denote any kind of drapery hung up against the walls or wainscoting of a room.

Paper Hangings. See *PAPER-Hangings*.

Wool Hangings. See *TAPESTRY*.

HANGCLIFF, a remarkable point of land on the east coast of the largest of the Shetland Islands. It is frequently the first land seen by ships in northern voyages. Captain Phipps determined its situation to be in W. Long. $0^{\circ} 56' 30''$. N. Lat. $60^{\circ} 9'$.

HANNIBAL, a famous Carthaginian general, of whose exploits an account is given under the articles CARTHAGE and ROME. After having had the misfortune to lose a sea-fight with the Rhodians, through the cowardice of Apollonius one of the admirals of Antiochus the Great, he was forced to fly into Crete, to avoid falling into the hands of the Romans. On his arrival in this island, he took sanctuary among the Gortynii; but as he had brought great treasure along with him, and knew the avarice of the Cretans, he thought proper to secure his riches by the following stratagem. He filled several vessels with melted lead, just covering them over with gold and silver. These he deposited in the temple of Diana, in the presence of the Gortynii, with whom, he said, he trusted all his treasure: Justin tells us, that he left this with them as a security for his good behaviour, and lived for some time very quietly in these parts. He took care, however, to conceal his riches in hollow statues of brass; which, according to some, he always carried along with him; or, as others will have it, exposed in a public place, as things of little value. At last he retired to the court of Prusias king of Bithynia, where he found means to unite several of the neighbouring states with that prince into a confederacy against Eumenes king of Pergamus, a professed friend to the Romans; and during the ensuing war gave Eumenes several defeats, more through the force of his own genius, than the valour of his troops. The Romans having received intelligence of the important services performed by Hannibal, immediately dispatched T. Quintius Flaminius as an ambassador to Prusias, in order to procure his destruction. At his first audience, he complained of the protection given to that famous general, representing him "as the most inveterate and implacable enemy the Romans ever had; as one who had ruined both his own country and Antiochus, by drawing them into a destructive war with Rome."—Prusias, in order to ingratiate himself with the Romans, immediately sent a party of soldiers to surround Hannibal's house, that he might find it impossible to make his escape. The Carthaginian, having before discovered that no confidence was to be reposed in Prusias, had contrived seven secret passages from his house, in order to evade the machinations of his enemies, even if they should carry their point at the Bithynian court. But guards being posted at these, he could not fly, though, according to Livy, he attempted it. Perceiving, therefore, no possibility of escaping, he had recourse to poison, which he had long reserved for such a melancholy occasion. Then taking it in his hand,

Hannibal.

"Let us (said he) deliver the Romans from the diffidence with which they have long been tortured, since they have not patience to wait for an old man's death. Flaminius will not acquire any reputation or glory by a victory gained over a betrayed and defenceless person. This single day will be a lasting testimony of the degeneracy of the Romans. Their ancestors gave Pyrrhus intelligence of a design to poison him, that he might guard against the impending danger, even when he was at the head of a powerful army in Italy; but they have deputed a person of consular dignity to excite Prusias impiously to murder one who has taken refuge in his dominions, in violation of the laws of hospitality." Then having denounced dreadful imprecations against Prusias, he drank the poison, and expired at the age of 70 years. Cornelius Nepos acquaints us, that he put an end to his life by a subtle poison which he carried about with him in a ring. Plutarch relates, that, according to some writers, he ordered a servant to strangle him with a cloak wrapped about his neck; and others say, that, in imitation of Midas and Themistocles, he drank bull's blood.

With respect to the character of this general, it appears to have been in military affairs what Demosthenes was in oratory, or Newton in mathematics; namely, absolutely perfect, in which no human wisdom could discover a fault, and to which no man could add a perfection. Rollin hath contrasted his character with that of Scipio Africanus. He enumerates the qualities which make a complete general; and having then given a summary of what historians have related concerning both commanders, is inclined to give the preference to Hannibal. "There are, however, (he says) two difficulties which hinder him from deciding; one drawn from the characters of the generals whom Hannibal vanquished; the other from the errors he committed. May it not be said, (continues our author,) that those victories which made Hannibal so famous were as much owing to the imprudence and temerity of the Roman generals, as to his bravery and skill? When a Fabius and a Scipio were sent against him, the first stopped his progress, the other conquered him."

These reasons have been answered by Mr Hooke, who hath taken some pains to vindicate Hannibal's character, by fully and fairly comparing it with that of Scipio Africanus, and other Roman commanders. "I do not see (says he) why these difficulties should check our author's inclination to declare in favour of the Carthaginian. That Fabius was not beaten by Hannibal, we cannot much wonder, when we remember how steadily the old man kept to his resolution never to fight with him. But from Fabius's taking this method to put a stop to the victories of the enemy, may we not conclude that he knew no other, and thought Hannibal an overmatch for him? And why does our author forget Publius Scipio (Africanus's father), a prudent and able general, whom Hannibal vanquished at the Ticin? Livy relates some victories of Hannibal over the celebrated Marcellus; but neither Marcellus nor any other general ever vanquished Hannibal before the battle of Zama, if we may believe Polybius, (lib. xv. c. 16.). Terentius Varro, indeed, is represented as a headstrong rash man; but the battle

Hannibal
Hanover.

Hanover,
Hanfe.

battle of Cannæ was not lost by his imprudence. The order in which he drew up his army is no where condemned; and Chevalier Folard thinks it excellent. And as to the conduct of the battle, Æmilius Paulus, a renowned captain, and a disciple of Fabius, had a greater share in it than his colleague. The imprudence with which Varro is taxed, was his venturing, contrary to his colleague's advice, with above 90,000 men to encounter in a plain field, an enemy who had only 50,000, but was superior in horse. And does not the very advice of Æmilius, and the charge of temerity on Varro for not following it, imply a confession of Hannibal's superiority in military skill, over Æmilius as well as Varro? It ought likewise to be observed, that Hannibal's infantry had gained the victory over the Roman infantry, before this latter suffered any thing from the Carthaginian cavalry. It was otherwise when Scipio gained the victory at Zama. His infantry would probably have been vanquished but for his cavalry. Hannibal, with only his third line of foot (his Italian army), maintained a long fight against Scipio's three lines of foot; and seems to have had the advantage over them, when Masinissa and Lælius, with the horse, came to their assistance. Polybius indeed says, that Hannibal's Italian forces were equal in number to all Scipio's infantry; but this is contradicted by Livy, and is not very probable. The authority of Polybius, who was an intimate friend of Scipio Æmilianus, is, I imagine, of little weight in matters where the glory of the Scipios is particularly concerned. His partiality and flattery to them are, in many instances, but too visible."

Our author then proceeds to shew, that Hannibal was not guilty of any of the faults laid to his charge as a general; and having contrasted the moral characters of the two generals with each other, makes it evident, that as a man, as well as a general, Hannibal had greatly the advantage of his rival. See *Hooke's Roman history*, vol. iv. p. 151. & seq.

HANNO, general of the Carthaginians, was commanded to sail round Africa. He entered the ocean through the Straits of Gibraltar, and discovered several countries. He would have continued his navigation, had it not been for want of provisions. He wrote an account of his voyage, which was often quoted, but not much credited. Sigismund Gelenius published it in Greek at Basil, by Frobenius, in 1533. He lived, according to Pliny, when the affairs of the Carthaginians were in the most flourishing condition; but this is a very indeterminate expression.

HANOVER, a city of Germany, and capital of an electorate of the same name, of which the king of Great Britain is elector.—Though the house of Hanover is the last that hath been raised to the electoral dignity in the empire, it may vie with any in Germany for the antiquity and nobleness of its family. It is likewise very considerable for the extent of its territories, which at present are, The duchy of Calenberg, in which are the cities of Hanover, Calenberg, Hameln, Neustadt, Göttingen, &c.; the duchy of Grubenhagen, the county of Diepholt, the county of Illo, in the bishopric of Hildesheim; the bailiages of Coldingen, Luther, Badenborg, and Westerhoven, with the right of protection of the city of Hildesheim; and the county of Danneberg, ceded by the dukes of

Wolfenbüttele to the dukes of Lüneburg, as an equivalent for their pretensions on the city of Brunfwic. The elector possesses likewise the county of Delmenhorst, and the duchies of Bremen and Verden, sold by the king of Denmark in 1715: the right of possessing alternatively the bishopric of Osnabrück belongs solely to the electoral branch; but if it shall happen to fail, the dukes of Wölffenbüttele are to enjoy the same right.

In consideration of the great services performed by Ernest Augustus, duke of Brunfwic-Hanover, in the wars which the emperor Leopold had with Louis XIV. that emperor conferred the dignity of an elector of the holy Roman empire upon him and his heirs male, of which he received the investiture on the 19th of December 1692. This new creation met with great opposition both in the electoral college and the college of princes; but at last, by a conclusion of the three colleges on the 30th of January 1708, it was unanimously determined, that the electoral dignity should be confirmed to the duke of Hanover and his heirs male; but it was added, that if, while that electoral dignity subsisted, the Palatine electorate should happen to fall into the hands of a Protestant prince, the first Catholic elector should have a supernumerary vote.

The princes of this house have their seat in the college of princes, immediately after those of the electoral houses; each branch having a vote. The elector, besides his seat in the electoral college, was invested with the office of arch standard-bearer of the empire; but this being disputed with him by the duke of Wirtemberg, the elector Palatine having obtained the office of arch-treasurer, yielded that of arch-treasurer to the elector of Hanover, who was confirmed in this dignity by a decree of the diet of the 13th of January 1710. For the administration of the government, the elector has a council of state, a council of war, the court of justice, the chancery, the justice of the court, and a consistory. But for making new laws, or establishing new taxes, the consent of the states, which are composed of the nobility, clergy, and burghers, is required.

The city of Hanover is agreeably situated in a sandy plain on the river Leye, in E. Long. to 5. N. Lat. 22. 5. It is a large well-built town, and pretty well fortified. The established religion is the Lutheran; but the Catholics are tolerated, and have a handsome church. It has suffered greatly by the French, who got possession of it in 1757, but were soon after driven out. It is noted for a particular kind of beer, reckoned excellent in these parts. This city was the residence of the elector before he ascended the throne of Great Britain. The palace makes no great show outwardly, but within it is richly furnished. The regency of the country is administered in the same manner as if the sovereign was present.

HANSE, or HANS, an ancient name for a society or company of merchants; particularly that of certain cities in Germany, &c. hence called *Hanse-towns*. See *Hanse-Towns*.—The word *hanse* is obsolete High Dutch or Teutonic; and signifies "alliance, confederacy, association," &c. Some derive it from the two German words, *am-see*, that is, "on the sea" by reason the first hanse towns were all situated on the sea-coast: whence the society is said to have been first

called *am see steden*, that is, "cities on the sea;" and afterwards, by abbreviation, *hansee*, and *hanse*.

HANSE TOWNS. The hanseatic society was a league between several maritime cities of Germany, for the mutual protection of their commerce. Bremen and Amsterdam were the two first that formed it; whose trade received such advantage by their fitting out two men of war in each to convoy their ships, that more cities continually entered into the league: even kings and princes made treaties with them, and were often glad of their assistance and protection; by which means they grew so powerful both by sea and land, that they raised armies as well as navies, enjoyed countries in sovereignty, and made peace or war, though always in defence of their trade, as if they had been an united state or commonwealth.

At this time also abundance of cities, though they had no great interest in trade, or intercourse with the ocean, came into their alliance for the preservation of their liberties: so that in 1200 we find no less than 72 cities in the list of the towns of the Hanse; particularly Bremen, Amsterdam, Antwerp, Rotterdam, Dort, Bruges, Ostend, Dunkirk, Middleburg, Calais, Rouen, Rochelle, Bourdeaux, St Malo, Bayonne, Bilbao, Lisbon, Seville, Cadiz, Carthage, Barcelona, Marseilles, Leghorn, Naples, Messina, London, Lubec, Rostock, Stralsund, Stetin, Wismar, Königsberg, Dantzic, Elbing, Marienburg.

The alliance was now so powerful, that their ships of war were often hired by other princes to assist them against their enemies. They not only aided, but often defeated, all that opposed their commerce; and, particularly in 1358, they took such revenge of the Danish fleet in the Sound, for having interrupted their commerce, that Waldemar III. then king of Denmark, for the sake of peace, gave them up all Schonen for 16 years; by which they commanded the passage of the Sound in their own right.—In 1428 they made war on Erick king of Denmark with 250 sail, carrying on board 12,000 men. These so ravaged the coast of Jutland, that the king was glad to make peace with them.

Many privileges were bestowed upon the hanse towns by Lewis XI. Charles VIII. Lewis XII. and Francis I. kings of France; as well as by the emperor Charles V. who had divers loans of money from them; and by king Henry III. who also incorporated them into a trading body, in acknowledgment for money which they had advanced to him, as well as for the good services they did him by their naval forces in 1206.

These towns exercised a jurisdiction among themselves; for which purpose they were divided into four colleges or provinces, distinguished by the names of their four principal cities, viz. Lubec, Cologne, Brunswick, and Dantzic, wherein were held their courts of judicature. They had a common stock or treasury at Lubec, and power to call an assembly as often as necessary.—They kept magazines or warehouses for the sale of their merchandises in London, Bruges, Antwerp, Berg in Norway, Revel in Livonia, Novogorod in Muscovy, which were exported to most parts of Europe, in English, Dutch, and Flemish bottoms. One of their principal magazines was at London, where a society of German merchants was formed, called the *sheephead company*. To this company great

privileges were granted by Edward I. but revoked by act of parliament in 1552 in the reign of Edward VI. on a complaint of the English merchants that this company had so engrossed the cloth-trade, that, in the preceding year, they had exported 50,000 pieces, while all the English together had shipped off but 1100. Queen Mary, who ascended the throne the year following, having resolved to marry Philip the emperor's son, suspended the execution of the act for three years: but after that term, whether by reason of some new statute, or in pursuance of that of king Edward, the privileges of that company were no longer regarded, and all efforts of the hanse-towns to recover this loss were in vain.

Another accident that happened to their mortification was while queen Elizabeth was at war with the Spaniards. Sir Francis Drake happening to meet 60 ships in the Tagus, laden with corn belonging to the hanse-towns, took out all the corn as contraband goods which they were forbid to carry by their original patent. The hanse towns having complained of this to the diet of the empire, the queen sent an ambassador thither to declare her reasons. The king of Poland likewise interested himself in the affair, because the city of Dantzic was under his protection. At last, though the queen strove hard to preserve the commerce of the English in Germany, the emperor excluded the English company of merchant-adventurers, who had considerable factories at Stade, Embden, Bremen, Hamburg, and Elbing, from all trade in the empire. In short, the hanse-towns, in Germany in particular, were not only in so flourishing, but in so formidable a state, from the 14th to the 16th centuries, that they gave umbrage to all the neighbouring princes, who threatened a strong confederacy against them; and, as the first step towards it, commanded all the cities within their dominion or jurisdiction to withdraw from the union or hanse, and be no farther concerned therein. This immediately separated all the cities of England, France, and Italy, from them. The hanse, on the other hand, prudently put themselves under the protection of the empire: and as the cities just now mentioned had withdrawn from them; so they withdrew from several more, and made a decree among themselves, that none should be admitted into their society but such as stood within the limits of the German empire, or were dependent thereon; except Dantzic, which continued a member, though in nowise dependent on the empire, only it had been summoned formerly to the imperial diet. By this means they maintained their confederacy for the protection of their trade, as it was begun, without being any more envied by their neighbours. Hereby likewise they were reduced to Lubec, Bremen, Hamburg, and Dantzic; in the first of which they kept their register, and held assemblies once in three years at least. But this hanse or union has for some time been dissolved; and now every one of the cities carries on a trade separately for itself, according to the stipulation in such treaties of peace, &c. as are made for the empire betwixt the emperor and other potentates.

HARANGUE, a modern French name for a speech or oration made by an orator in public.—Menage derives the word from the Italian *arenga*, which signifies the same; formed, according to Ferrari, from *arringo*,
“a

Harbour
Hardouin.

"a just, or place of jutting." Others derive it from the Latin *ara*, "altar;" by reason the first harangues were made before altars: whence the verse of Juvenal, *Aul. Lugdunensis rhetor discitur ad aram.*

The word is also frequently used in an ill sense, viz. for a too pompous, prolix, or unseasonable speech or declamation.

HARBOUR, a general name given to any sea-port or haven; as also to any place convenient for mooring shipping, although at a great distance from the sea. The qualities requisite in a good harbour are, that the bottom be entirely free from rocks or shallows; that the opening be of sufficient extent to admit the entrance or departure of large ships, without difficulty; that it should have good anchoring-ground, and be easy of access; that it should be well defended from the violence of the wind and sea; that it should have room and convenience to receive the shipping of different nations, and those which are laden with different merchandises; that it be furnished with a good light-house, and have variety of proper rings, posts, moorings, &c. in order to remove or secure the vessels contained therein; and, finally, that it have plenty of wood, and other materials for firing, besides hemp, iron, mariners, &c.

HARBURG, a small town of Germany in the circle of Lower Saxony, and duchy of Luneburg, seated on the river Elbe over against Hamburg. It was surrounded with walls in 1355; and 30 years after, a strong castle, which still remains, was built by the bishop. E. Long. 9. 41. N. Lat. 53. 51.

HARDENING, the giving a greater degree of hardness to bodies than they had before.

There are several ways of hardening iron and steel, as by hammering them, quenching them in cold water, &c. See **STEEL**.

Case HARDENING. See **CASE-HARDENING**.

HARDERWICK, a town of the United Provinces in Dutch Guelderland. It is a well-built town, and the chief of the sea-ports of this province. It has several good buildings, particularly the great church, which is much admired. In 1643, the public school here was turned into an university. The French did it a great deal of damage in 1672, since which time it has been on the decline. E. Long. 5. 37. N. Lat. 52. 14.

HARDNESS, a quality of certain bodies, which consists in an intimate union and strong adhesion of their integrant parts, which cannot therefore be easily disjoined.—We cannot precisely determine what disposition of parts occasions the greatest hardness; but this probably depends on the perfection and extent of the contact of these parts: and this quality depends essentially upon their figure, which we do not know.—The hardest of bodies which we do know, are vitrifiable stones; and amongst these the hardest are also the most pure and homogeneous, that is, diamonds. Not any one of all known bodies is perfectly hard. This quality belongs undoubtedly to the primary or elementary particles of matter, which of all beings we know the least of.

HARDOUIN (John), a learned French Jesuit in the beginning of the 18th century, known by the remarkable paradoxes he advanced in his writings; this in particular, That all the works of the ancient pro-

fane writers, except Cicero's works, Virgil's Georgics, Horace's satires and epistles, and Pliny's natural history, are mere forgeries. He died at Paris in 1729, aged 83. His principal works are, 1. An edition of Pliny's natural history, with notes, which is much esteemed. 2. An edition of the councils, which made much noise. 3. Chronology restored by medals, 4to. 4. A commentary on the New Testament, folio; in which he pretends that our Saviour and his apostles preached in Latin, &c.

HARDWICKE. See **YORK**.

HARE, in zoology. See **LEPUS**.

The hare is a beast of venery, or of the forest, but peculiarly so termed in the second year of her age. There are reckoned four sorts of them, from the place of their abode: some live in the mountains, some in the fields, some in marshes, and some wander about every where. The mountain-hares are the swiftest, the field-hares are not so nimble, and those of the marshes are the slowest: but the wandering hares are the most dangerous to follow; for they are cunning in the ways and mazes of the fields, and, knowing the nearest ways, run up the hills and rocks, to the confusion of the dogs, and the discouragement of the hunters. See the article **HUNTING**.

HARE-LIP, in surgery. See **SURGERY**.

HARFLUER, an ancient town of France, [in Normandy; but is now a poor place, on account of its fortifications being demolished, and its harbour choked up. It was taken by the English, by assault, in the year 1415. It is seated on the river Lizarda, near the Seine, five miles from Havre de Grace, forty north-west of Rouen, and one hundred and six north-west of Paris. E. Lon. o. 17. N. Lat. 49. 30.

HARIOT, or **HERIOT**, in law, a due belonging to a lord at the death of his tenant, consisting of the best beast, either horse, or cow, or ox, which he had at the time of his death; and in some manors the best goods, piece of plate, &c. are called harlots.

HARIOT (Thomas), See **HARRIOT**.

HARLECH, a town of Merionethshire, in north Wales. It is seated on a rock, on the sea-shore; and is but a poor place, though the shire-town, and sends a member to parliament. It had formerly a strong, handsome castle, which was a garrison for Charles I. in the civil wars, for which reason it was afterwards demolished by the parliament. W. Long. 4. o. N. Lat. 54. 47.

HARLEIAN COLLECTION.—A most valuable collection of useful and curious manuscripts, begun near the end of the last century, by Robert Harley of Brampton Bryan, esq. in Herefordshire, afterwards earl of Oxford and lord high-treasurer; and which was conducted upon the plan of the great Sir Robert Cotton. He published his first considerable collection in August 1705, and in less than ten years he got together near 2500 rare and curious MSS. Soon after this, the celebrated Dr George Hicks, Mr Anstis garter king at arms, bishop Nicolson, and many other eminent antiquaries, not only offered him their assistance in procuring MSS. but presented him with several that were very valuable. Being thus encouraged to perseverance by his success, he kept many persons employed in purchasing MSS. for him abroad, giving them written instructions for their

Hardwicke
Harleian.

Harlem
Harley.

their conduct. By these means the MS. library was, in the year 1721 increased to near 6000 books, 14,000 original charters, and 500 rolls.

On the 21st of May 1724, lord Oxford died; but his son Edward, who succeeded to his honours and estate, still farther enlarged the collection; so that when he died, June 16th 1741, it consisted of 8000 volumes, several of them containing distinct and independent treatises, besides many loose papers which have been since sorted and bound up in volumes; and above 40,000 original rolls, charters, letters patents, grants, and other deeds and instruments of great antiquity.

The principal design of making this collection was the establishment of a MS. English historical library, and the rescuing from destruction such national records as had eluded the diligence of preceding collectors: but lord Oxford's plan was more extensive; for his collection abounds also with curious MSS. in every science.—This collection is now in the British Museum; and an enumeration of its contents may be seen in the Annual Register, vi. 140, &c.

HARLEM, a town of the United Provinces, in Holland, situated on the river Sparen, in E. Lon. 5. 17. N. Lat. 53. 22. It is a large and populous city, and stands near a lake of the same name, with which it has a communication as well as with Amsterdam and Leyden, by means of several canals. Schemes have been often formed for draining of this lake, but were never put in execution. To the south of the town lies a wood, cut into delightful walks and vistas. The town is famous for the siege which it held out against the Spaniards for ten months in 1573; the townsmen, before they capitulated, being reduced to eat the vilest animals, and even leather and grass. The inhabitants corresponded with the prince of Orange for a considerable time by means of carrier-pigeons. Harlem, as is well known, claims the invention of printing; and in fact, the first essays of the art are indisputably to be attributed to Laurentius, a magistrate of that city. [See LAURENTIUS, and (*History of*) PRINTING.] Before the Reformation, Harlem was a bishop's see; and the Papists still greatly outnumber the Protestants. An academy of sciences was founded here in 1752. Vast quantities of linen and thread are bleached here; the waters of the lake having a peculiar quality, which renders them very fit for that purpose.—A sort of phrensy with regard to flowers, particularly tulips, once prevailed here, in consequence of which the most beautiful sorts were bought and sold at an extravagant price.

HARLEQUIN, a buffoon or merry-andrew; but the word is now used for a person of extraordinary agility, dressed in party-coloured clothes, the principal character in a pantomime entertainment.

HARLEY (Robert), earl of Oxford and Mortimer, was the eldest son of Sir Edward Harley, and born in 1661. At the Revolution, Sir Edward and his son raised a troop of horse at their own expence; and after the accession of king William and queen Mary, he obtained a seat in parliament. His promotions were rapid: in 1702, he was chosen speaker of the house of commons; in 1704, he was sworn of queen Anne's privy council, and the same year made secretary of state; in 1706, he acted as one of the commissioners for the treaty of Union; and in 1710, was

appointed a commissioner of the treasury, and chancellor and under-treasurer of the exchequer. A daring attempt was made on his life, March 8. 1711, by the marquis of Guiscard a French papist; who, when under an examination before a committee of the privy council, stabbed him with a penknife. Of this wound, however, he soon recovered; and was the same year created earl of Oxford, and lord high treasurer, which office he resigned just before the queen's death. He was impeached of high treason in 1715, and committed to the tower; but was cleared by trial, and died in 1724. His character has been variously represented, but cannot be here discussed. He was not only an encourager of literature, but the greatest collector in his time of curious books and MSS. his collection of which makes a capital part of the British Museum. See *HARLEIAN Collection*.

HARLING. See *HERLING*.

HARLINGEN, a sea-port town of the United Netherlands, in West Friesland. It stands on the coast of the Zuyder sea, at the mouth of a large canal, in E. Long. 5. 25. N. Lat. 53. 12. It was only a hamlet till about the year 1234, when it was destroyed by the sea; and being afterwards rebuilt, became a considerable town. In 1579, it was considerably enlarged by the care of William prince of Orange. It is now very well fortified, and is naturally strong, as the adjacent country can very easily be laid under water. The city is square; and the streets are handsome, straight, and clean, with canals in the middle of them. It has five gates; four towards the land, and one towards the sea; but though the harbour is good, yet vessels of great burthen cannot get into it until they are lightened, for want of water. The admiralty college of Friesland has its seat here. The manufactures are salt, bricks, and tiles; a considerable trade is also carried on in all sorts of linen cloth, and the adjacent country yields abundance of corn and good pastures.

HARLOT, a woman given to incontinency, or that makes a habit or a trade of prostituting her body.—The word is supposed to be used for the diminutive *whorelet*, a "little whore."—Others derive it from *Arletta*, mistress to Robert duke of Normandy, and mother to William the Conqueror: Camden derives it from one *Arlotha*, concubine to William the Conqueror: Others from the Italian *Arletta*, "a proud whore."

HARMONIA, in fabulous history, the wife of Cadmus, both of whom were turned into serpents. See *CADMUS*.

Though many of the ancient authors make Harmonia a princess of divine origin, there is a passage in Athenæus from Euhemerus, the Vanini of his time, which tells us, that she was by profession a player on the flute, and in the service of the prince of Sidon previous to her departure with Cadmus. This circumstance, however, might encourage the belief, that, as Cadmus brought letters into Greece, his wife brought *harmony* thither; as the word *αρμονια*, *harmonia*, has been said to have no other derivation than from her name: which makes it very difficult to ascertain the sense in which the Greeks made use of it in their music; for it has no roots by which it can be decomposed, in order to deduce from them its etymology. The common account of the word, however, that is given

Harling
Harmonia.

† See
Harmony.

Harmonica. given by lexicographers, and generally adopted by the learned, does not confirm this opinion. It is generally derived from *αρμόζω*, and this from the old verb *Ἀρμω ἀπτο, to fit or join*.

HARMONICA. This word, when originally appropriated by Dr Franklin to that peculiar form or mode of musical glasses, which he himself, after a number of happy experiments, had constituted, was written *Armonica*. In this place, however, we have ventured to restore it to its native plenitude of sound, as we have no antipathy against the moderate use of aspirations. It is derived from the Greek word *ἀρμονία*. The radical word is *ἄρμω, to suit or fit one thing to another*. By the word *ἀρμονία*, the Greeks expressed aptitudes of various kinds; and from the use which they made of that expression, we have reason to conclude, that it was intended to import the highest degree of refinement and delicacy in those relations which it was meant to signify. Relations or aptitudes of sound, in particular, were understood by it; and in this view, Dr Franklin could not have selected a name more expressive of its nature and genius, for the instrument which we are now to describe; as, perhaps, no musical tone can possibly be finer, nor consequently susceptible of juster concords, than those which it produces.

In an old English book, whose title we cannot at present recollect, and in which a number of various amusements were described, we remember to have seen the elements or first approaches to music by glasses. That author enjoins his pupil to choose half a dozen of such as are used in drinking; to fill each of them with water in proportion to the gravity or acuteness of the sound which he intended it should produce; and, having thus adjusted them one to another, he might entertain the company with a church-tune. These, perhaps, were the rude and barbarous hints which Mr Puckeridge afterwards improved. But, for a farther account of him, of the state in which he left the instrument, and of the state to which it has afterwards been carried, we must refer our readers to the following extracts from Dr Franklin's letters, and from others who have written upon the same subject.

The Doctor, in his letter to Father Beccaria, has given a minute and elegant account of the *Harmonica*. Nor does it appear that his successors have either more sensibly improved, or more accurately delineated, that angelic instrument. The detail of his own improvements, therefore, shall be given in his own words.

"Perhaps (says he) it may be agreeable to you, as you live in a musical country, to have an account of the new instrument lately added here to the great number that charming science was possessed of before: As it is an instrument that seems peculiarly adapted to Italian music, especially that of the soft and plaintive kind, I will endeavour to give you such a description of it, and of the manner of constructing it, that you or any of your friends may be enabled to imitate it, if you incline so to do, without being at the expence and trouble of the many experiments I have made in endeavouring to bring it to its present perfection.

"You have doubtless heard the sweet tone that is drawn from a drinking-glass, by pressing a wet finger round its brim. One Mr Puckeridge, a gentleman

from Ireland, was the first who thought of playing tunes formed of these tones. He collected a number of glasses of different sizes; fixed them near each other on a table; and tuned them, by putting into them water, more or less, as each note required. The tones were brought out by pressing his fingers round their brims. He was unfortunately burnt here, with his instrument, in a fire which consumed the house he lived in. Mr E. Delaval, a most ingenious member of our Royal Society, made one in imitation of it, with a better choice and form of glasses, which was the first I saw or heard. Being charmed with the sweetness of its tones, and the music he produced from it, I wished to see the glasses disposed in a more convenient form, and brought together in a narrower compass, so as to admit of a greater number of tones, and all within reach of hand to a person sitting before the instrument; which I accomplished, after various intermediate trials, and less commodious forms, both of glasses and construction, in the following manner.

"The glasses are blown as near as possible in the form of hemispheres, having each an open neck or socket in the middle. The thickness of the glass near the brim is about the tenth of an inch, or hardly quite so much, but thicker as it comes nearer the neck; which in the largest glasses is about an inch deep, and an inch and a half wide within; these dimensions lessening as the glasses themselves diminish in size, except that the neck of the smallest ought not to be shorter than half an inch.—The largest glass is nine inches diameter, and the smallest three inches. Between these there are 23 different sizes, differing from each other a quarter of an inch in diameter. To make a single instrument, there should be at least six glasses blown of each size; and out of this number one may probably pick 37 glasses (which are sufficient for three octaves with all the semitones) that will be each either the note one wants, or a little sharper than that note, and all fitting so well into each other as to taper pretty regularly from the largest to the smallest. It is true, there are not 37 sizes; but it often happens that two of the same size differ a note or half a note in tone, by reason of a difference in thickness, and these may be placed one in the other without sensibly hurting the regularity of the taper form.

"The glasses being chosen, and every one marked with a diamond the note you intend it for, they are to be tuned by diminishing the thickness of those that are too sharp. This is done by grinding them round from the neck towards the brim, the breadth of one or two inches as may be required; often trying the glass by a well-tuned harpichord, comparing the note drawn from the glass by your finger, with the note you want, as sounded by that string of the harpichord. When you come near the matter, be careful to wipe the glass clean and dry before each trial, because the tone is something flatter when the glass is wet than it will be when dry;—and grinding a very little between each trial, you will thereby tune to great exactness. The more care is necessary in this, because, if you go below your required tone, there is no sharpening it again but by grinding somewhat off the brim, which will afterwards require polishing, and thus increase the trouble.

"The glasses being thus tuned, you are to be pro-

provided with a case for them, and a spindle on which they are to be fixed. My case is about three feet long, eleven inches every way wide within at the biggest end, and five inches at the smallest end; for it tapers all the way, to adapt it better to the conical figure of the set of glasses. This case opens in the middle of its height, and the upper part turns up by hinges fixed behind. The spindle is of hard iron, lies horizontally from end to end of the box within, exactly in the middle, and is made to turn on brass gudgeons at each end. It is round, an inch diameter at the thickest end, and tapering to a quarter of an inch at the smallest.—A square shank comes from its thickest end through the box, on which shank a wheel is fixed by a screw. This wheel serves as a fly to make the motion equable, when the spindle, with the glasses, is turned by the foot like a spinning wheel. My wheel is of mahogany, 18 inches diameter, and pretty thick, so as to conceal near its circumference about 25 lb of lead.—An ivory pin is fixed in the face of this wheel, about four inches from the axis. Over the neck of this pin is put the loop of the string that comes up from the moveable step to give it motion. The case stands on a neat frame with four legs.

“To fix the glasses on the spindle, a cork is first to be fitted in each neck pretty tight, and projecting a little without the neck, that the neck of one may not touch the inside of another when put together, for that would make a jarring. These corks are to be perforated with holes of different diameters, so as to suit that part of the spindle on which they are to be fixed. When a glass is put on, by holding it stiffly between both hands, while another turns the spindle, it may be gradually brought to its place. But care must be taken that the hole be not too small, lest in forcing it up the neck should split; nor too large, lest the glass, not being firmly fixed, should turn or move on the spindle, so as to touch or jar against its neighbouring glass. The glasses thus are placed one in another; the largest on the biggest end of the spindle, which is to the left hand: the neck of this glass is towards the wheel; and the next goes into it in the same position, only about an inch of its brim appearing beyond the brim of the first; thus proceeding, every glass when fixed shows about an inch of its brim (or three quarters of an inch, or half an inch, as they grow smaller) beyond the brim of the glass that contains it; and it is from these exposed parts of each glass that the tone is drawn, by laying a finger on one of them as the spindle and glasses turn round.

“My largest glass is G a little below the reach of a common voice, and my highest G, including three complete octaves.—To distinguish the glasses more readily to the eye, I have painted the apparent parts of the glasses within-side, every semitone white, and the other notes of the octave with the seven prismatic colours, viz. C, red; D, orange; E, yellow; F, green; G, blue; A, indigo; B, purple; and C, red again;—so that the glasses of the same colour (the white excepted) are always octaves to each other.

“This instrument is played upon, by sitting before the middle of the set of glasses, as before the keys of a harpicoord, turning them with the foot, and wetting them now and then with a sponge and clean water. The fingers should be first a little soaked in water, and

quite free from all greasiness; a little fine chalk upon them is sometimes useful, to make them catch the glass and bring out the tone more readily. Both hands are used, by which means different parts are played together.—Observe, that the tones are best drawn out when the glasses turn from the ends of the fingers, not when they turn to them.

“The advantages of this instrument are, that its tones are incomparably sweet beyond those of any other; that they may be swelled and softened at pleasure by stronger or weaker pressures of the finger, and continued to any length; and that the instrument, being once well-tuned, never again wants tuning.”

Such was the state in which this learned and ingenious author found, and such the perfection to which he carried, that celestial instrument of which we now treat. We call it *celestial*; because, in comparison with any other instrument which we know, the sounds that it produces are indeed heavenly. Some of them, however, are still constructed in the same imperfect manner as the instrument of Mr Puckeridge. They are contained in an oblong chest; their positions are either exactly or nearly rectilinear; the artificial semitones by which the full notes are divided, form another parallel line; but the distances between each of them are much greater than those between the notes of the natural scale, as they take their places, not directly opposite to the notes which they are intended to heighten or depress, but in a situation between the highest and lowest, to show, that, in ascending, they are sharps to the one, and in descending, flats to the other. This structure, however, is doubly inconvenient; for it not only increases the labour and difficulty of the performer, but renders some musical operations impracticable, which upon the *Harmonica*, as constituted by Dr Franklin, may be executed with ease and pleasure. In this fabric, if properly formed and accurately tuned, the instrument is equally adapted to harmony and melody. But as no material structure could ever yet be brought to the perfection even of human ideas, this instrument still in some measure retains the perverse nature of its original lamina. Hence it is not without the utmost difficulty that the glasses can be tuned by grinding, and the least conceivable redundancy or defect renders the discord upon this instrument more conspicuous and intolerable than upon any other. Hence likewise that inexpressible delicacy to be observed in the manner of the friction by which the sound is produced: for if the touch be too gentle, it cannot extort the tone; and if too strong, besides the mellow and delicate sound which ought to be heard, we likewise perceive the finger jarring upon the glass, which, mingled with those softer sounds by which the senses had been soothed, gives a feeling similar to iron grating upon iron, but more disagreeable. In wind-instruments the operation of the tongue, in harpsichords the stroke of the quill, and on the violin the motion of the bow, gives that strong and sensible interruption of sound which may be called *articulation*, and which renders the rhythm or measure of an air more perceptible: but, upon the glasses, the touch of the finger is too soft to divide the notes with so much force; so that, unless the mind be steadily attentive, they seem to melt one into another, by which means the idea of rhythm is almost lost. There is no way of performing a slur, but by for-

forbearing to stop the first sound, when that which is immediately subsequent commences. Thus, when the slur is of any length, and regularly defends or rises by the interval of a second, all the notes in the slur must be heard together, and produce no agreeable dissonance; yet if it rises or defends by perfect chords, the effect is pleasing. The open shake, or trill, is another unhappy operation upon musical glasses; which can only be performed by the alternate pulsations of two continued sounds, differing from each other only by a note or semitone. But, as these pulsations, thus managed, cannot be distinct, the result is far from being pleasant; nor is there any succedaneum for the close shake, which in the violin is performed by alternately depressing the string to the finger-board, and suffering it to rise without entirely removing the finger from it, and which, by giving the note that tremulous sound produced by the human voice affected with grief, is a grace peculiarly adapted to pathetic and plaintive airs.

We proceed, however, to a farther account of the same instrument, extracted from the Annual Register, vol. iv. p. 149.

" Besides those tones (says the author of that account) which every elastic string produces by a vibration of all its parts, it is capable of another set of tones, in which only a part of the string is supposed to vibrate. These sounds are produced by the lightest touches, either by air, as in Oswald's lyre, or by rubbing the bow in the softest manner on the string of a fiddle.

" Analogous to these sounds are those produced by bells; in those last, besides those tones produced by their elliptical vibrations, there are a set of tones which may be brought by gently rubbing their edges, and in which the whole instrument does not appear to vibrate in all its parts as before.

" Take, for instance, a bell finely polished at the edges; or, what will perhaps be more convenient, a drinking-glass: let the edges be as free from any thing oily as possible; then, by moistening the finger in water (I have found alum-water to be best), and rubbing it circularly round the edge of the glass, you will at length bring out the tone referred to.

" This note is possessed of infinite sweetness; it has all the excellencies of the tone of a bell, without its defects. It is loud, has a sufficient body, is capable of being swelled and continued at pleasure; and, besides, has naturally that vibratory softening, which musicians endeavour to imitate, by mixing with the note to be played, a quarter-tone from below.

" To vary these tones, nothing more is required than to procure several bells or glasses of different tones, tuned as nearly as possible, which may be done by thinning the edges of either: or, for immediate satisfaction, the glasses may be tuned by pouring in water; the more water is poured in, the graver the tone will be.

" Let us suppose then a double octave of those glasses, thus tuned, to be procured. Any common tune may be executed by the fingers rubbing upon each glass successively; and this I have frequently done without the least difficulty, only choosing those tones which are slow and easy. Here then are numbers of delicate tones, with which musicians have been,

will very lately, unacquainted; and the only defect is, that they cannot be made to follow each other with that celerity and ease which is requisite for melody. In order to remedy this, I took a large drinking-glass, and by means of a wheel and gut, as in the electrical machine, made it to turn upon its axis with a moderately quick but equable motion; then moistening the finger as before, nothing more was required than merely to touch the glass at the edge, without any other motion, in order to bring out the tone.

" Instead of one glass only turning in this manner, if the whole number of glasses were to fixed as to keep continually turning, by means of a wheel, it follows, that upon every touch of the finger a note would be expressed; and thus, by touching several glasses at once, an harmony of notes might be produced, as in an harpsichord.

" As I write rather to excite than satisfy the curious, I shall not pretend to direct the various ways this number of glasses may be contrived to turn; it may be sufficient to say, that if the glasses are placed in the segment of a circle, and then a strap, as in a cutler's wheel, be supposed to go round them all, the whole number will by this means be made to turn, by means of a wheel.

" Instead of the finger, I have applied moistened leather to the edge of the glass, in order to bring out the tone: but, for want of a proper elasticity, this did not succeed. I tried cork, and this answered every purpose of the finger; but made the tone much louder than the finger could do. Instead, therefore of the finger, if a number of corks were so contrived as to fall with a proper degree of pressure on the edge of the glass, by means of keys like the jacks of an organ, it is evident, that in such a case a new and tolerably perfect instrument would be produced; not so loud indeed as some, but infinitely more melodious than any.

" The mouths of the glasses or bells used in this experiment should not resemble the mouth of a trumpet, but should rather come forward with a perpendicular edge. The corks used in this case should be smooth, even free from those blemishes which are usually found in them, and at the same time the more elastic the better."

In the two accounts here given seems to be comprehended every thing valuable which has been said upon the subject. It remains, however, our permanent opinion, that the form and structure designed and constituted by Dr Franklin is by much the most eligible; nor can we admit, that a cork, however successfully applied, will produce the same mellowness and equability of tone in general, with the finger. It appears to us, that, by this kind of voluntary attrition, a note may be sunk or swelled with much more art and propriety than by the substitution of any thing else extrinsic to the hand; and when chords are long protracted, that degree of friction, which renders every found in the chord sensible to the ear, without harshness, must be the most agreeable. For this reason, likewise, we should recommend alum-water in preference to chalk.

From what has already been said, it will easily be perceived, that this instrument requires to be tuned with the nicest degree of delicacy which the laws of temperament will possibly admit. For these laws the reader will naturally have recourse to the article Music $\frac{7}{12}$, $\frac{1}{2}$ Chap. vii. art. 64.

Harmonica

in this Dictionary; where, from M. D'Alembert, is given a plain and satisfactory account, both of the method proposed by Rameau, and of that established in common practice, without anticipating the experience and taste of the reader, by dictating which of these plans is preferable. To those who have occasion to tune the instrument, it may likewise be useful to peruse the detached article TEMPERAMENT in this Work. Without recapitulating the different rules of alteration prescribed in these accounts, we shall presuppose the reader acquainted with them; and proceed to describe how, under their influence, the *Harmonica* may be tuned. But it is previously expedient to observe, that the same rules which conduct the process of tuning a harpsichord, will be equally effectual in tuning the *Harmonica*; with this only difference, that greater delicacy in adjusting the chords should, if practicable, be attempted.

There are different notes from whence the procedure of tuning may commence. *La* or *A*, which is the key that pretty nearly divides the harpsichord, is chosen by some; this *la* in common spinets is 24 natural keys from the bottom, and 13 from the top; and the *ut* above it, or second C upon the G cleff, by others. This last we should rather advise, because we imagine those intervals which we have called *seconds major* to be more just through the whole octave, when the course of tuning is begun by a natural semitone. The initiate, therefore, may begin by tuning the second *ut* of his *Harmonica*, or C above the treble cleff, in unison with its correspondent C upon the harpsichord or any other instrument in concert-pitch; then, descending to its octave below, adjust it with the *ut* above, till every pulsation if possible be lost, and the sounds rendered scarcely distinguishable when simultaneously heard. To the lowest note of this octave he must tune the *sol* or G immediately above it by a fifth, still observing the laws of temperament: To this G, the *re*, or D immediately above it, by the same chord: To the *re*, or D above, its octave below: To this, by a fifth, the *la* or A immediately above it: To *la*, the *mi* or E ascending in the same proportion: To *mi*, its octave below: To this, the *fi* or B immediately above it by a fifth: To the first *ut*, or C, which was tuned, the *fa* or F immediately below by the same chord.

That the practitioner may be still more secure in the justice and propriety of his procedure, he may try the thirds of the notes already adjusted, and alter, as much as is consistent with the fifths and octaves, such among these thirds as may seem grating and disagreeable to his ear. Thus far having accomplished his operation, he may tune all the other natural notes whether above or below by octaves. His next concern is with the semitones. And here it will be suggested by common sense, that as in all instruments with fixed scales the sharp of a lower must likewise answer for the flat of a higher tone, the semitone ought as nearly as possible to divide the interval. He may begin with *la* or A sharp, which *la* in its natural state is a third minor beneath the *ut* or C, from whence he began in the natural scale. This semitone should correspond with the F natural immediately above by a fifth. To it may be tuned the *re* or D sharp immediately below by a similar chord: To D sharp, its octave above: To *fi* or B natural, immediately above the *la* or A first mentioned, may be

adjusted the F or *fa* sharp immediately above it: To *ut* sharp its octave below: To that octave, the C or *ut* sharp above by a fifth: To the C sharp, its octave below: To this, by a fifth, the G or *sol* sharp above. Between this G sharp and the D sharp immediately above it, the fifth will probably be too sharp; but if the others are justly tuned, that discord will not be extremely offensive; and it is a necessary consequence of temperament. The rest of the sharps and flats, like their naturals, whether ascending or descending, may be tuned by their octaves.

The notes, with their chords, may be expressed by letters and figures, thus; where, however, it must be observed, that the higher notes of any chord are marked with larger capitals. It should likewise be remarked, that the figures are not expressive of the different ratios which the notes bear one to another, considered with respect to their vibrations; but only significant of their nominal distances, according to the received denominations of the intervals. Cc \acute{c} G \acute{c} D \acute{c} D \acute{c} A \acute{c} E Ee \acute{e} B Cr. The sharps and flats thus, A \sharp F \sharp , A \times D \times , D \times D \times , B \sharp F \sharp , F \sharp F \sharp , F \times C \times , C \times C \times , c \times G \times . In running over the sharps and flats as the naturals, it will likewise be necessary to try the thirds, and to alter such as may offend the ear; which, if cautiously done, will not sensibly injure the other chords.—Though this article has been protracted to a length which we did not originally intend, we have however the satisfaction to find, that it comprehends every thing essential; so that any person who understands the nature of chords, and the practical principles of music as universally taught, may not only be able to tune his instrument, but to acquire its whole manœuvre, without the least assistance from a master.

On Plate CLIX. is represented an instrument of this kind, made by Mr Dobb of St Paul's Church-yard, London.

HARMONIC. As an adjective, it signifies in general any thing belonging to harmony; though, in our language, the adjective is more properly written *harmonic*. In this sense it may be applied to the *harmonic* divisions of a monochord; or, in a word, to consonances in general. As a substantive neuter, it imports all the concomitant or accessory sounds which, upon the principles resulting from the experiments made on sonorous bodies, attend any given sound whatever, and render it appetible. Thus all the aliquot parts of a musical string produce *harmonic* sounds, or *harmonics*.

HARMONY. The sense which the Greeks gave to this word in their music, is so much less easy to be determined, because, the word itself being originally a substantive proper, it has no radical words by which we might analyse it, to discover its etymology. In the ancient treatises which remain to us, *harmony* appears to be that department whose object is the agreeable succession of sounds, merely considered as high or low; in opposition to the two others called *rhythmica* and *metrica*, which have their principle in time and measure. This leaves our ideas concerning that aptitude of sound vague and undetermined; nor can we fix them without studying for that purpose all the rules

Harmony. of the art: and even after we have done so, it will be very difficult to distinguish *harmony* from melody, unless we add to the last the ideas of rhythmus and measure; without which, in reality, no melody can have a distinguishing character: whereas harmony is characterized by its own nature, independent of all other quantities except the chords or intervals which compose it.

It appears by a passage of Nicomachus, and by others, that they likewise gave the name of *harmony* to the chord of an octave, and to concerts of voices and instruments, which performed in the distance of an octave one from the other, and which is more commonly called *antiphone*.

Harmony, according to the moderns, is a succession of chords agreeable to the laws of modulation. For a long time this *harmony* had no other principle but such rules as were almost arbitrary, or solely founded on the approbation of a practised ear, which decided concerning the agreeable or disagreeable succession of chords, and whose determinations were at last reduced to calculation. But Father Merfenne and M. Saver having found, that every found, however simple in appearance, was always accompanied with other sounds less sensible, which constitute with itself a perfect chord-major; with this experiment M. Rameau set out, and upon it formed the basis of his harmonic system, which he has extended to a great many volumes, and which at last M. D'Alembert has taken the trouble of explaining to the public.

Signior Tartini, taking his route from an experiment which is newer and more delicate, yet not less certain, has reached conclusions similar enough to those of Rameau, by pursuing a path whose direction seems quite opposite. According to M. Rameau, the treble is generated by the bass; Signior Tartini makes the bass result from the treble. One deduces *harmony* from melody, and the other supposes quite the contrary. To determine from which of the two schools the best performances are likely to proceed, no more is necessary than to investigate the end of the composer, and discover whether the air is made for the accompaniments, or the accompaniments for the air. At the word *SYSTEM* in Rousseau's Musical Dictionary, is given a delineation of that published by Signior Tartini. Here he continues to speak of M. Rameau, whom he has followed through this whole work, as the artist of greatest authority in the country where he writes.

He thinks himself obliged, however, to declare, That this system, however ingenious it may be, is far from being founded upon nature; an affirmation which he incessantly repeats: "That it is only established upon analogies and congruities, which a man of invention may overturn to-morrow, by substituting others more natural: that, in short, of the experiments from whence he deduces it, one is detected fallacious, and the other will not yield him the consequences which he would extort from it. In reality, when this author took it in his head to dignify with the title of *demonstration* the reasonings upon which he established his theory, every one turned the arrogant pretence into ridicule. The Academy of Sciences loudly disapproved a title so ill-founded, and so gratuitously assumed; and M. Etienne, of the Royal Society at Montpellier, has shewn him, that even to begin with this proposition, That

according to the law of nature, sounds are represented by their octaves, and that the octaves may be substituted for them, there was not any one thing demonstrated, or even firmly established, in his pretended demonstration." He returns to his system.

"The mechanical principle of reference prevents us with nothing but independent and solitary chords; it neither prescribes nor establishes their succession. Yet a regular succession is necessary; a dictionary of selected words is not an oration, nor a collection of legitimate chords a piece of music: there must be a meaning, there must be connections in music as well in language: it is necessary that what has preceded should transmit something of its nature to what is subsequent, so that all the parts conjoined may form a whole, and be stamped with the genuine character of unity.

"Now, the complex sensation which results from a perfect chord, must be resolved into the simple sensation of each particular sound which composes it, and into the sensation of each particular interval which forms it, ascertained by comparison one with another. Beyond this there is nothing sensible in any chord; from whence it follows, that it is only by the relation between sounds, and by the analogy between intervals, that the connection now in question can be established; and this is the genuine, the only source, from whence flow all the laws of *harmony* and modulation. If, then, the whole of *harmony* were only formed by a succession of perfect chords-major, it would be sufficient to proceed by intervals similar to those which compose such a chord; for then some one or more sounds of the preceding chord being necessarily protracted in that which is subsequent, all the chords would be found sufficiently connected, and the *harmony* would, at least in this sense, be one.

"But besides that these successions must exclude all melody by excluding the diatonic series which forms its foundation, it would not arrive at the real end of the art; because, as music is a system of meanings like a discourse, it ought like a discourse to have its periods, its phrases, its suspenses, its cadences, its punctuation of every kind; and because the uniformity of a harmonical procedure implies nothing of all this. Diatonic procedures require that major and minor chords should be intermixed; and the necessity of dissonances has been felt in order to distinguish the phrases, and render the cadences sensible. Now, a connected series of perfect chords-major, can neither be productive of perfect chords-minor nor of dissonances, nor can sensibly mark any musical phrase, and the punctuation must there be found entirely defective.

"M. Rameau being absolutely determined, in his system, to deduce from nature all the *harmony* practised among us, had recourse, for this effect, to another experiment of his own invention, of which I have formerly spoken, and which by a different arrangement is taken from the first. He pretended, that any simple sound whatever afforded in its multiples a perfect minor or flat chord, of which it was the dominant or fifth, as it furnished a perfect chord-major by the vibration of its aliquot parts, of which it is the tonic or fundamental sound. He has affirmed as a certain fact, that a vocal string caused two others lower than itself to vibrate through their whole ex-

Harmony. tent, yet without making them produce any sound, one to its twelfth major and the other to its seventeenth; and from this joined to the former fact, he has very ingeniously deduced, not only the application of the minor mode and of dissonances in *harmony*, but the rules of harmonic phrases and of all modulation, such as they are found at the words *Chord, Accompaniment, Fundamental Bass, Cadence, Dissonance, Modulation*.

"But first, (continues Rousseau) the experiment is false. It is discovered, that the strings tuned beneath the fundamental sound do not entirely vibrate when this fundamental sound is given; but that they are divided in such a manner as to return its unison alone, which of consequence can have no harmonics below. It is moreover discovered, that the property of strings in dividing themselves, is not peculiar to those which are tuned by a twelfth and seventeenth below the principal sound; but that oscillations are likewise produced in the lower strings by all its multiples. Whence it follows, that the intervals of the twelfth and seventeenth below, not being singular phenomena of their kind, nothing can be concluded in favour of the perfect minor chord which they represent.

"Though the truth of this experiment were granted, even this would by no means remove the difficulty. If, as M. Rameau alleges, all harmony is derived from the resonance of sonorous bodies, it cannot then be derived only from the vibrations of such bodies as do not refund. In reality, it is an extraordinary theory, to deduce from bodies that do not refund the principles of *harmony*; and it is a position in natural philosophy no less strange, that a sonorous body should vibrate without refunding, as if found itself were any thing else but the air impelled by these vibrations. Moreover, sonorous bodies do not only produce, besides the principal sound, the other tones which with itself compose a perfect chord; but an infinite number of other sounds, formed by all the aliquot parts of the bodies in vibration, which do not enter into that perfect harmony. Why then should the former sounds produce consonances, and why should the latter not produce them, since all of them equally result from nature?

"Every sound exhibits a chord truly perfect, since it is composed of all its harmonics, and since it is by them that it becomes a sound. Yet these harmonics are not heard, and nothing is distinguished but a simple sound, unless it be exceedingly strong: whence it follows, that the only good harmony is an unison; and that as soon as the consonances can be distinguished, the natural proportion being altered, the *harmony* has lost its purity.

"That alteration is in this case produced two different ways. First, by causing certain harmonics to refund, and not the others, the proportion of force which ought to prevail in all of them is altered, for producing the sensation of a single sound; whence the unity of nature is destroyed. By doubling these harmonics, an effect is exhibited similar to that which would be produced by suppressing all the others; for in that case we cannot doubt, but that, along with the generating sound, the tones of the other harmonics which were permitted to sound would be heard: whereas, in leaving all of them to their natural operations,

they destroy one another, and conspire together in *Harmony*, forming and strengthening the simple sensation of the principal sound. It is the same effect which the full sound of a stop in the organ produces, when, by successively removing the stopper or register, the third and fifth are permitted to sound with the principal; for then that fifth and third, which remained absorbed in the other sounds, are separately and disagreeably distinguished by the ear.

"Moreover, the harmonics which we cause to sound have other harmonics pertaining to themselves, which cannot be such to the fundamental sound. It is by these additional harmonics that the sounds which produce them are distinguished with a more sensible degree of harshness; and these very harmonics which thus render the chord perceptible, do not enter into its *harmony*. This is the reason why the most perfect chords are naturally displeasing to ears whose relish for harmony is not sufficiently formed; and I have no hesitation in thinking, that even the octave itself might be displeasing, if the mixture of male and female voices did not inure us to that interval from our infancy.

"With dissonance it is still worse; because, not only the harmonics of the sound by which the discord is produced, but even the sound itself is excluded from the natural harmony of the fundamental: which is the cause why discord is always distinguished amongst all the other sounds in a manner shocking to the sense.

"Every key of an organ, with the stop fully opened, gives a perfect chord with its third-major, which are not distinguished from the fundamental sound, if the hearer is not extremely attentive, and if he does not sound the whole stop in succession; but these harmonic sounds are never absorbed in the fundamental, but on account of the prodigious noise, and by such a situation of the registers as may cause the pipes which produce the fundamental sound to conceal by their force the other sounds which produce these harmonics. Now, no person observes, nor can observe, this continual proportion in a concert; since, by the manner of inverting the *harmony*, its greatest force must in every instant be transferred from one part to another; which is not practicable, and would destroy the whole melody.

"When we play upon the organ, every key in the bass causes to refund the perfect chord major; but because that bass is not always fundamental, and because the music is often modulated in a perfect minor chord, this perfect chord-major is rarely struck with the right hand; so that we hear the third minor with the major, the fifth with the triton, the seventh redundant with the octave, and a thousand other cacophonies, which, however, do not much disgust our ears, because habit renders them tractable; but it is not to be imagined that an ear naturally just would prove so patient of discords, when first exposed to the test of this *harmony*.

"M. Rameau pretends, that trebles composed with a certain degree of simplicity naturally suggest their own basses; and that any man having a just, though unpractised ear, would spontaneously sing that bass. This is the prejudice of a musician, refuted by universal experience. Not only would he, who has never heard either bass or *harmony*, be of himself incapable

Harmony.

Harmony.

of finding either the *bass* or the *harmony* of M. Rameau, but they would be displeasing to him if he heard them, and he would greatly prefer the simple unison.

“When we consider, that, of all the people upon earth, who have all of them some kind of music and melody, the Europeans are the only people who have a *harmony* consisting of chords, and who are pleased with this mixture of sounds; when we consider that the world has endured for so many ages, whilst, of all the nations which cultivated the fine arts, not one has found out this *harmony*: that not one animal, not one bird, not one being in nature, produces any other chord but the unison; nor any other music but melody: that the eastern languages, so sonorous, so musical; that the ears of the Greeks, so delicate, so sensible, practised and cultivated with so much art, have never conducted this people, luxurious and enamoured of pleasure as they were, towards this *harmony* which we imagined so natural: that without it their music produced such astonishing effects; that with it ours is so impotent: that, in short, it was reserved for the people of the north, whose gross and callous organs of sensation are more affected with the noise and clamour of voices, than with the sweetness of accents and the melody of inflections, to make this grand discovery, and to vend it as the essential principle upon which all the rules of the art were founded; when, in short, attention is paid to all these observations, it is very difficult not to suspect that all our *harmony* is nothing but a Gothic and barbarous invention, which would never have entered into our minds, had we been truly sensible to the genuine beauties of art, and of that music which is unquestionably natural.

“M. Rameau asserts, however, that *harmony* is the source of the most powerful charms in music. But this notion is contradictory both to reason and to matter of fact. To fact it is contradictory; because, since the invention of counter-point, all the wonderful effects of music have ceased, and it has lost its whole force and energy. To which may be added, that such beauties as purely result from harmony are only perceived by the learned; that they affect none with transport but such as are deeply conversant in the art: whereas the real beauties of music, resulting from nature, ought to be, and certainly are, equally obvious to the adept and the novice. To reason it is contradictory; since harmony affords us no principle of imitation by which music, in forming images and expressing sentiments, can rise above its native excellence till it becomes in some measure dramatic or imitative, which is the highest pitch of elevation and energy to which the art can aspire; since all the pleasures which we can receive from the mere mechanical influence of sounds are extremely limited, and have very little power over the human heart.”

Thus far we have heard M. Rousseau, in his observations on *harmony*, with patience; and we readily grant, that the *system of harmony* by M. Rameau is neither demonstrated, nor capable of demonstration. But it will not follow, that any man of invention can so easily and so quickly subvert those aptitudes and analogies on which the system is founded. Every hypothesis is admitted to possess a degree of probability proportioned to the number of phenomena for which it offers a satisfactory solution. The first experiment of M. Ra-

meau is, that every sonorous body, together with its principal sound and its octave, gives likewise its twelfth and seventeenth major above; which being approximated as much as possible, even to the chords immediately represented by them, return to the third, fifth, and octave, or, in other words, produce perfect harmony. This is what nature, when solicited, spontaneously gives; this is what the human ear, unprepared and uncultivated, imbibes with ineffable avidity and pleasure. Could any thing which claims a right to our attention, and acceptance from nature, be impressed with more genuine or more legible signatures of her function than this? We do not contend for the truth of M. Rameau's second experiment. Nor is it necessary we should. The first, expanded and carried into all its consequences, resolves the phenomena of harmony in a manner sufficient to establish its authenticity and influence. The difficulties for which it affords no solution are too few and too trivial either to merit the regard of an artist or a philosopher, as M. D'Alembert in his *elements* has clearly shown. The facts with which M. Rousseau confronts this principle, the armies of multiplied harmonics generated in *inquitum*, which he draws up in formidable array against it, only show the thin partitions which sometimes may divide philosophy from whim. For, as bodies are infinitely divisible, according to the philosophy now established, or as, according to every philosophy, they must be indefinitely divisible, each infinitesimal of any given mass, which are only harmonics to other principal sounds, must have fundamental tones and harmonics peculiar to themselves; so that, if the reasoning of Rousseau has any force against M. Rameau's experiment, the ear must be continually distracted with a chaos of inappreciable harmonics, and melody itself must be lost in the confusion. But the truth of the matter is, that, by the wise institution of nature, there is such a conformity established between our senses and their proper objects, as must prevent all these disagreeable effects. Rousseau and his opponent are agreed in this, that the harmonics conspire to form one predominant sound; and are not to be detected but by the nicest organs, applied with the deepest attention. It is equally obvious, that, in an artificial harmony, by a proper management of this wise precaution of nature, dissonances themselves may be either entirely concealed, or considerably softened. So that, since by nature sonorous bodies in actual vibration are predisposed to exhibit perfect harmony; and since the human ear is, by the same wise regulation, fabricated in such a manner as to perceive it; the harmonical chaos of M. Rousseau may be left to operate on his own brain, where it will probably meet with the warmest reception it can expect to find. Nor does it avail him to pretend, that before the harmonics can be distinguished, sonorous bodies must be impelled with a force which alters the chords, and destroys the purity of the harmony; for this position is equally false both in theory and practice. In theory, because an impulse, however forcible, must proportionally operate on all the parts of any sonorous body, so far as it extends: in practice, because the human ear actually perceives the harmony to be pure. What effects his various manoeuvres upon the organ may have, we leave to such as have leisure and curiosity enough to try the experiments: but it is

† M. Rousseau was alive when this article was written.

Harmony.

apprehended, that when tried, their results will leave the system of Rameau, particularly as remodelled by D'Alembert, in its full force.

Of all the whims and paradoxes maintained by this philosopher, none is more extravagant than his assertion, that every chord, except the simple unison, is displeasing to the human ear: nay, that we are only reconciled to octaves themselves by being inured to hear them from our infancy. Strange, that nature should have fixed this invariable proportion between male and female voices, whilst at the same time she inspired the hearers with such violent prepossessions against it as were invincible but by long and confirmed habit! The translator of *D'Alembert's Elements*, as given under the article *Music* in this Dictionary, has been at peculiar pains to investigate his earliest recollections upon this subject; and has had such opportunities, both of attending to his original perceptions, and of recognizing the fidelity of his memory, as are not common. He can remember, even from a period of early childhood, to have been pleased with the simplest kinds of artificial harmony; to have distinguished the harmonics of sonorous bodies with delight; and to have been struck with horror at the sound of such bodies as, by their structure, or by the cohesion of their parts, exhibited these harmonics false. This is the chief, if not the only cause, of the tremendous and disagreeable sensation which we feel from the sound of the Chinese gong. The same horrible cacophony is frequently, in some degree, produced by a drum unequally braced: from this sound the translator often remembers to have started and screamed, when carried through the streets of the town in which he was born in the arms of his nursery-maid; and as he is conscious, that the acoustic organs of many are as exquisite as his own, he cannot doubt but they may have had the same sensations, though perhaps they do not recollect the facts. So early and so nicely may the sensations of harmony and discord be distinguished. But after all, it seems that *harmony* is no more than a modern invention, and, even at this late period, only known to the Europeans. We should, however, be glad to know, from what oracle our philosopher learned, that harmony was not known to antiquity. From what remains of their works, no proof of his position can be derived; and we have at least mentioned one probability against it in our notes to the Preliminary Discourse to the article *Music*, (see Note n.) But though Rousseau's mighty objections were granted, that harmony can only be endured by such ears as are habitually formed and cultivated; that the period of its prevalence has been short, and the extent of its empire limited to Europe; still his conclusion, that it is a Gothic and barbarous invention, is not fairly deducible even from these premises. Must we affirm, that epic poetry has no foundation in nature, because, during the long interval which happened from the beginning of the world to the destruction of Troy, no epic poem seems to have appeared? Or because a natural and mellifluous verification is less relished by an unpolished taste, than the uncouth rhymes of a common ballad, shall we infer, that the power of numbers is merely supposititious and arbitrary? On the contrary, we will venture to affirm, that though harmony cannot, as Rameau supposes, be mathematically demonstrated

Harmony.

from the nature and vibrations of sonorous bodies; yet the idea of its constituent parts, and of their coalescence, is no less established, no less precise and definite, than any mode or property of space or quantity to be investigated by geometrical researches or algebraical calculations. It is certain, that the mimetic or imitative power of music chiefly consists in melody; but from this truth, however evident, it cannot be fairly deduced, that harmony is absolutely unfeeling of imitation. Perhaps every musical sound, even to the most simple, and all modulations of sound, are more or less remotely connected with some sentiment or passion of the human heart. We know, that there are instinctive expressions of pain or pleasure in their various modes and degrees, which, when uttered by any sensitive, and perceived by any conscious being, excite in the mind of the percipient a feeling sympathetic with that by which they are prompted. We likewise know from experience, that all artificial sounds modulated in the same manner, have similar, though not equal, effects. We have seen, that, in order to render harmony compatible with itself, the melody of each part must be congenial; and, for that reason, one kindred melody result from the whole. So far, therefore, as any composer has it in his power to render the general melody homogeneous; so far the imitation may be preserved, and even heightened: for such objects as are majestic and august, or the feelings which they excite, are more aptly expressed by a composition of kindred sounds, than by any simple tone whatever. They who suppose the mimetic powers of music to be consummated in the imitation of mere unmeaning sounds or degrees of motion, must entertain limited and unworthy ideas of its province. It is naturally a representative almost of every sentiment or affection of the soul; and, when this end is gained, the art must have reached its highest perfection, and produced its noblest effects. But these effects, however sensible among the ancients, may in us be superseded by other causes which remain yet unexplored. Theatrical performances are likewise, by them, said to have produced the most wonderful effects; yet these we do not recognize amongst ourselves, tho' we have dramatic entertainments perhaps not inferior to theirs.

Rousseau proceeds to tell us, that among the ancients, the *enharmonic* species of music was sometimes called *harmony*.

Direct HARMONY, is that in which the bass is fundamental, and in which the upper parts preserve among themselves, and with that fundamental bass, the natural and original order which ought to subsist in each of the chords that compose this harmony.

Inverted HARMONY, is that in which the fundamental or generating sound is placed in some of the upper parts, and when some other sound of the chord is transferred to the bass beneath the others.

HARMONY of the Spheres, or *Celestial HARMONY*, a sort of music much talked of by many of the ancient philosophers and fathers, supposed to be produced by the sweetly tuned motions of the stars and planets. This harmony they attributed to the various proportionate impressions of the heavenly globes upon one another, acting at proper intervals. It is impossible, according to them, that such prodigious large bodies, moving with so much rapidity, should be silent: on the contrary,

trary,

trary, the atmosphere, continually impelled by them, must yield a set of sounds proportionate to the impression it receives; consequently, as they do not all run the same circuit, nor with one and the same velocity, the different tones arising from the diversity of motions, directed by the hand of the Almighty, must form an admirable symphony or concert.

They therefore supposed, that the moon, as being the lowest of the planets, corresponded to *mi*; Mercury, to *fa*; Venus to *sol*; the Sun, to *la*; Mars, to *si*; Jupiter, to *ut*; Saturn, to *re*; and the orb of the fixed stars, as being the highest of all, to *mi*, or the octave.

HAROLD, the name of two English kings. See ENGLAND, n° 76, 82.

HARP, a musical instrument of the stringed kind, of a triangular figure, and held upright between the legs of the performer.

There is some diversity in the structure of harps. That called the *triple harp* has three rows of strings or chords, which in all make 78, or four octaves; the second row makes the half turn, and the third is unison with the first. There are two rows of pins on the right side, called *buttons*, that serve to keep the strings tight in their holes; which are fastened at the other end to three rows of pins on the upper side called the *keys*. This instrument is struck with the fingers and thumbs of both hands: its music is like that of the spinet, whence some have called it the *inverted spinet*. There are among us two sorts of this instrument, viz. the Irish harp, which is stringed with wire; and the Welsh harp, stringed with gut.

As to ancient harps, two are represented on Plate CL.—Fig. 26. is a *trigonum* or triangular harp. It is taken from an ancient painting in the museum of the king of Naples, in which it is placed on the shoulder of a little dancing cupid, who supports the instrument with his left hand, and plays upon it with his right. The trigonum is mentioned by Athenæus, lib. iv. and by Julius Pollux, lib. iv. cap. 9. According to Athenæus, Sophocles calls it a *Phrygian instrument*; and one of his dipnosophists tells us, that a certain musician, named *Alexander Alexandrinus*, was such an admirable performer upon it, and had given such proofs of his abilities at Rome, that he made the inhabitants *μουσικισται*, musically mad.

Fig. 25. is the Theban harp, according to a drawing made by J. Bruce, esq; from an ancient painting in one of the sepulchral grottos of the first kings of Thebes. "The performer is clad in a habit made like a shirt, such as the women still wear in Abyssinia, and the men in Nubia. This seems to be white linen or muslin, with narrow stripes of red. It reaches down to his ancles; his feet are without sandals and bare; his neck and arms are also bare; his loose wide sleeves are gathered above his elbows; and his head is close shaved. His left hand seems employed in the upper part of the instrument among the notes in *alto*, as if in an *arpeggio*; while, stooping forwards, he seems with his right hand to be beginning with the lowest string, and promising to ascend with the most rapid execution: this action, so obviously rendered by an indifferent artist, shews that it was a common one in his time; or, in other words, that great hands were then frequent, and consequently that music was well

understood, and diligently followed.

"If we allow the performer's stature to be about five feet ten inches, then we may compute the harp in its extreme length to be something less than six feet and a half. It seems to support itself in *equilibrio* on its foot or base, and needs only the player's guidance to keep it steady. It has 13 strings; the length of these, and the force and liberty with which they are treated, shew that they are made in a very different manner from those of the lyre. (See LYRE.)

"This instrument is of a much more elegant form than the triangular Grecian harp. It wants the forepiece of the frame, opposite to the longest string; which certainly must have improved its tone, but must likewise have rendered the instrument itself weaker, and more liable to accidents if carriage had not been so convenient in Egypt. The back part is the sounding board, composed of four thin pieces of wood, joined together in form of a cone, that is, growing wider towards the bottom; so that, as the length of the string increases, the square of the correspondent space, in the sounding board, in which the tone is to undulate, always increases in proportion.

"Besides that the whole principles upon which the harp is constructed are rational and ingenious, the ornamental parts are likewise executed in the very best manner; the bottom and sides of the frame seem to be finereed, or inlaid, probably with ivory, tortoiseshell, and mother-of-pearl, the ordinary produce of the neighbouring seas and deserts. It would be even now impossible to finish an instrument with more taste and elegance.

"Besides the elegance of its outward form, we must observe, likewise, how near it approached to a perfect instrument; for it wanted only two strings of having two complete octaves in compass. Whether these were intentionally omitted or not, we cannot now determine, as we have no idea of the music or taste of that time; but if the harp be painted in the proportions in which it was made, it might be demonstrated that it could scarce bear more than the 13 strings with which it was furnished. Indeed the cross-bar would break with the tension of the four longest, if they were made of the size and consistence and tuned to the pitch that ours are at present.

"I look upon this instrument then, as the Theban harp, before and at the time of Sesostris, who adorned Thebes, and probably caused it to be painted there, as well as the other figures in the sepulchre of his father, as a monument of the superiority which Egypt had in music at that time over all the barbarous nations that he had seen or conquered.

"We know, about the time of Sesostris, if, as Sir Isaac Newton supposes, this prince and Sefac were the same, that in Palestine the harp had only ten strings; but as David, while he played upon it, both danced and sung before the ark, it is plain, that the instrument upon which he played could have been but of small volume, we may suppose little exceeding in weight our guitar; though the origin of this harp was probably Egyptian, and from the days of Moses it had been degenerating in size, that it might be more portable in the many peregrinations of the Israelites."

To the above account by Mr Bruce, Dr Burney *History of Music*, number p. 225. subscribes the following observations. "The number of

Harp. of strings, the size and form of this instrument, and the elegance of its ornaments, awaken reflections, which to indulge would lead us too far from our purpose, and indeed out of our depth. The mind is wholly lost in the immense antiquity of the painting in which it is represented. Indeed the time when it was executed is so remote, as to encourage a belief, that arts after having been brought to great perfection, were again lost, and again invented long after this period.—

“With respect to the number of strings upon this harp, if conjectures may be allowed concerning the method of tuning them, two might be offered to the reader's choice. The first idea that presented itself at the sight of 13 strings was, that they would furnish all the semitones to be found in modern instruments within the compass of an octave, as from C to c, D to d, or E to e. The second idea is more Grecian, and conformable to antiquity; which is, that if the longest string represented *Proslabanomenos*, or D, the remaining 12 strings would supply all the tones, semitones, and quarter-tones, of the diatonic, chromatic, and enharmonic genera of the ancients, within the compass of an octave: but for my part I would rather incline to the first arrangement, as it is more natural, and more conformable to the structure of our organs, than the second. For with respect to the genera of the Greeks, though no historic testimony can be produced concerning the invention of the diatonic and chromatic, yet ancient writers are unanimous in ascribing to Olympus the Phrygian the first use of the enharmonic: and though in the beginning the melody of this genus was so simple and natural as to resemble the wild notes and rude essays of a people not quite emerged from barbarism; yet in after-times it became overcharged with finical fopperies, and fanciful beauties, arising from such minute divisions of the scale as had no other merit than the great difficulty of forming them.

“It seems a matter of great wonder, with such a model before their eyes as the Theban harp, that the form and manner of using such an instrument should not have been perpetuated by posterity; but that, many ages after, another of an inferior kind, with fewer strings, should take place of it. Yet if we consider how little we are acquainted with the use and even construction of the instruments which afforded the greatest delight to the Greeks and Romans, or even with others in common use in a neighbouring part of Europe only a few centuries ago, our wonder will cease; especially if we reflect upon the ignorance and barbarism into which it is possible for an ingenious people to be plunged by the tyranny and desolation of a powerful and cruel invader.”

Bell-HARP, a musical instrument of the string kind, thus called from the common players on it swinging it about, as a bell on its bair.

It is about three feet long; its strings, which are of no determinate number, are of brass or steel wire, fixed at one end, and stretched across the sound-board by screws fixed at the other. It takes in four octaves, according to the number of the strings, which are struck only with the thumbs, the right hand playing the treble, and the left hand the base: and in order to draw the sound the clearer, the thumbs are armed with a little wire pin. This may perhaps be the lyra,

or cythara of the ancients; but we find no mention made of it under the name it now bears, which must be allowed to be modern.

HARP of Æolus. See ACOUSTICS, n° 10.

HARFAGIUS. See ARFAGIUS.

HARPALUS, a Greek astronomer, who flourished about 480 B. C. corrected the cycle of eight years invented by Cleostratus; and proposed a new one of nine years, in which he imagined the sun and moon returned to the same point. But Harpalus's cycle was afterwards altered by Meton, who added ten full years to it. See ASTRONOMY, n° 304.

HARPIES, among the ancient poets, fabulous impure monsters, said to be the daughters of Neptune and Terra. Virgil mentions three of them, Aello, Ocyete, and Celæno; they are described to be fowls, with the face of a virgin, bears ears, their bodies like vultures, and hands like their crooked talons.

HARPING IRON. See HARPOON.

HARPINGS, the fore-parts of the whales which encompass the bow of a ship, and are fastened to the stem, being thicker than the after part of the whales, in order to reinforce the ship in this place, where she sustains the greatest shock of resistance in plunging into the sea, or dividing it, under a great pressure of sail.

HARPOCRATES, in Pagan theology, was the son of Isis, and esteemed the god of silence. He was represented under the form of a young man half naked, crowned with an Egyptian mitre, holding in his left hand a cornucopia, and a finger of the other placed on his lips as recommending silence.

HARPOCRATION, (Valerius), a celebrated ancient rhetorician of Alexandria, who has left us an excellent *Lexicon upon the ten orators of Greece*. Aldus first published this lexicon in the Greek at Venice in 1603. Many learned men have laboured upon it; but the best edition was given by James Gronovius at Leyden in 1696.

HARPSICORD, the most harmonious of all the musical instruments of the string-kind. It is played on after the manner of the organ, and he is furnished with a set, and sometimes with two sets of keys; the touching or striking of these keys moves a kind of little jacks, which also move a double row of chords or strings, of brass or iron, stretched over four bridges on the table of the instrument.

HARPOON, or **HARPING-IRON**, a spear or javelin used to strike the whales in the Greenland fishery.

The harpoon, which is sometimes called the *harping-iron*, is furnished with a long staff, having at one end a broad and flat triangular head sharpened at both edges, so as to penetrate the whale with facility: to the head of this weapon is fastened a long cord, called the *whale line*, which lies carefully coiled in the boat, in such a manner, as to run out without being interrupted or entangled. See WHALE-FISHERY.

HARQUEBUSS, a piece of fire-arms, of the length of a musket, usually cocked with a wheel. It carried a ball that weighed one ounce seven-eighths.

There was also a larger sort, called the great harquebuss, used for the defence of strong places, which carried a ball of about three ounces and a half; but they are now but little used, except in some old castles, and by the French in some of their garrisons.

HAR-

Harquebuss.
Harprocration.

Harrier
||
Harriot.

HARRIER, a kind of hound, endowed with an admirable gift of smelling, and very bold in the pursuit of his game.

HARRINGTON (Sir John), an ingenious English poet, was the son of John Harrington, esq; who was committed to the tower by queen Mary for holding a correspondence with her sister Elizabeth; who, when she came to the crown, stood godmother to this son. Before he was 30, he published a translation of Ariosto's Orlando Furioso, a work by which he was principally known; for though he afterwards published some epigrams, his talent did not seem to have lain that way. He was created knight of the bath by James I.; and presented a MS. to prince Henry, levelled chiefly at the married bishops. He is supposed to have died about the latter end of James's reign.

HARRINGTON (James), a most eminent English writer in the 17th century, bred at Oxford, travelled into Holland, France, Denmark and Germany, and learned the languages of those countries. Upon his return to England, he was admitted one of the privy-chamber extraordinary to king Cha. I. He served the king with great fidelity, and made use of his interest with his friends in parliament to procure matters to be accommodated with all parties. The king loved his company except when the conversation happened to turn upon commonwealths. He found means to see the king at St James's; and attended him on the scaffold, where, or a little before, he received a token of his majesty's affection. After the death of king Charles, he wrote his *Oceana*; a kind of political romance, in imitation of Plato's Commonwealth, which he dedicated to Oliver Cromwell. It is said, that when Oliver perused it, he declared, that "the gentleman had wrote very well, but must not think to cheat him out of his power and authority; for that what he had won by the sword, he would not suffer himself to be scribbled out of." This work was attacked by several writers, against whom he defended it. Beside his writings to promote republican principles, he instituted likewise a nightly meeting of several ingenious men in the New Palace-Yard, Westminster; which club was called the *Rota*, and continued till the secluded members of parliament being restored by general Monk, all their models vanished. In 1661, he was committed to the tower for treasonable designs and practices; and chancellor Hyde, at a conference with the lords and commons, charged him with being concerned in a plot. But a committee of lords and commons could make nothing of that plot. He was conveyed to St Nicolas' island, and from thence to Plymouth, where he fell into an uncommon disorder of the imagination. Having obtained his liberty by means of the earl of Bath, he was carried to London, and died in 1677. He published, besides the above works, several others, which were first collected by Toland, in one volume folio, in 1700; but a more complete edition was published, in 1737, by the reverend Dr Birch.

HARRIOT (Thomas), a celebrated algebraist, was born at Oxford in 1560, where he was also educated. In 1579, he completed his bachelor's degree; and, being already distinguished for his mathematical learning, was soon after recommended to Sir Walter

VOL. V.

Raleigh, as a proper person to instruct him in that science. He was accordingly received into the family of that gentleman; who, in 1585, sent him with the colony, under Sir Richard Grenville, to Virginia; of which country, having remained there about a year, he afterwards published a topographical description. About the year 1588, Mr Harriot was introduced by his patron Sir Walter Raleigh, to Henry Percy earl of Northumberland, who allowed him a pension of 120*l. per annum*. He spent many years of his life in Sion college; where he died in July 1621, of a cancer in his lip, and was buried in the church of St Christopher, where a handsome monument was erected to his memory. Anthony Wood tells us he was a deist, and that the divines looked upon his death as a judgement. Be his religious opinions what they might, he was doubtless one of the first mathematicians of the age in which he lived, and will always be remembered as the inventor of the present improved method of algebraical calculation. His improvements in algebra were adopted by Des Cartes, and for a considerable time imposed upon the French nation as his own invention; but the theft was at last detected, and exposed by Dr Wallis, in his History of Algebra, where the reader will find our author's invention accurately specified. His works are, 1. A brief and true report of the new-found land of Virginia; of the commodities there found, and to be raised, &c. 2. *Artis analyticae praxis ad equationes algebraicas nova expedita, et generali methodo resolvendas, e posthumis Thomae Harrioti*, &c. 3. *Ephemeris clyometrica*. Manuscript, in the library of Sion college. He is said to have left several other manuscripts which are probably lost.

HARRISON (John), a most accurate mechanic, the celebrated inventor of the famous *time-keeper* for ascertaining the longitude at sea, and also of the compound, or, as it is commonly called, the *gridiron pendulum*; was born at Foulby, in the parish of Wragby, near Pontefract in Yorkshire, in 1693. The vigour of his natural abilities, if not even strengthened by the want of education, which confined his attention to few objects, at least amply compensated the deficiencies of it; as fully appeared from the astonishing progress he made in that branch of mechanics to which he devoted himself. His father was a carpenter, in which profession the son assisted; occasionally also, according to the miscellaneous practice of country artists, surveying land, and repairing clocks and watches. He was, from his early childhood, attached to any machinery moving by wheels, as appeared while he lay sick of the small-pox about the 6th year of his age, when he had a watch placed open upon his pillow to amuse himself by contemplating on the movement. In 1700, he removed with his father to Barrow in Lincolnshire; where, though his opportunities of acquiring knowledge were very few, he eagerly improved every incident from which he might collect information; frequently employing all, or great part of his nights, in writing, or drawing; and he always acknowledged his obligations to a clergyman who came every Sunday to officiate in the neighbourhood, who lent him a MS. copy of professor Saunderson's Lectures; which he carefully and neatly transcribed, with all the diagrams. His native genius exerted

20 E

itself

Harriot.
Harrison.

itself superior to these folitary disadvantages; for in the year 1726, he had constructed two clocks, mostly of wood, in which he applied the escapement and compound pendulum of his own invention: these surpassed every thing then made, scarcely erring a second in a month. In 1728, he came up to London with the drawings of a machine for determining the longitude at sea, in expectation of being enabled to execute one by the the board of longitude. Upon application to Dr Halley, he referred him to Mr George Graham; who, discovering he had uncommon merit, advised him to make his machine before he applied to the board of longitude. He returned home to perform this task; and 1735, came to London again with his first machine; with which he was sent to Lisbon the next year for a trial of its properties. In this short voyage, he corrected the dead reckoning about a degree and a half; a success that proved the means of his receiving both public and private encouragement. About the year 1739, he completed his second machine, of a construction much more simple than the former, and which answered much better: this, though not sent to sea, recommended Mr Harrison yet stronger to the patronage of his private friends and of the public. His third machine, which he produced in 1749, was still less complicated than the second, and superior in accuracy, as erring only three or four seconds in a week. This he conceived to be the *ne plus ultra* of his attempts; but in an endeavour to improve pocket-watches, he found the principles he applied, to surpass his expectations so much, as to encourage him to make his fourth time-keeper, which is in the form of a pocket watch, about six inches diameter. With this time-keeper his son made two voyages, the one to Jamaica, and the other to Barbadoes: in both which experiments it corrected the longitude within the nearest limits required by the act of the 12th of queen Anne; and the inventor therefore, at different times, though not without infinite trouble, received the proposed reward of 20,000*l*. These four machines were given up to the board of longitude. The three former were not of any use, as all the advantages gained by making them were comprehended in the last: they were worthy, however, of being carefully preserved as mechanical curiosities, in which might be traced the gradations of ingenuity executed with the most delicate workmanship; whereas they now lie totally neglected, in the royal observatory at Greenwich. The fourth machine, emphatically distinguished by the name of *The time-keeper*, has been copied by the ingenious Mr Kendal; and that duplicate, during a three years circumnavigation of the globe in the southern hemisphere by captain Cook, answered as well as the original. The latter part of Mr Harrison's life was employed in making a fifth improved time-keeper on the same principles with the preceding one; which, at the end of a ten weeks trial, in 1772, at the king's private observatory at Richmond, erred only 4½ seconds. Within a few years of his death, his constitution visibly declined; and he had frequent fits of the gout, a disorder that never attacked him before his 77th year: he died at his house in Red-Lion Square, in 1776, aged 83. The reclusive manner of his life in the unremitted pursuit of his favourite object, was by no means calculated to qualify

him as a man of the world; and the many discouragements he encountered in soliciting the legal reward of his labours, still less disposed him to accommodate himself to the humours of mankind. In conversing on his profession, he was clear, distinct, and modest; yet, like many other mere mechanics, found a difficulty in delivering his meaning by writing; in which he adhered to a peculiar and uncouth phraseology. This was but too evident in his *Description concerning such mechanis as will afford a nice or true mensuration of time*, &c. 8vo. 1775; which his well-known mechanical talents will induce the public to account for from his unacquaintance with letters, from his advanced age, and attendant mental infirmities; among which may be reckoned his obdurate refusal to accept of any assistance whatever in this publication. This small work includes also an account of his new musical scale; or mechanical division of the octave, according to the proportion which the radius and diameter of a circle have respectively to the circumference. He had in his youth been the leader of a distinguished band of church-fingers; had a very delicate ear for music; and his experiments on sound, with a most curious monochord of his own improvement, are reported to have been not less accurate than those he was engaged to for the mensuration of time.

HARROW, in agriculture. See there, n° 89.

HART, a stag, or male deer, in the sixth year. See CERVUS.

HART's Horns, in pharmacy, the whole horns of the common male deer, as separated from the head, without farther preparation.

The chemical analysis of hart's-horn is sufficiently known: it yields a water highly impregnated with a volatile salt, which is called *spirit of hart's-horn*, with a fetid oil, and a volatile salt, by the common distillation in a retort.—The salt of hart's-horn, when pure, differs in nothing from other purified volatile alkalies. See CHEMISTRY, n° 329—336; VOLATILE Alkali; and Alkaline SPIRITS.

HARTFORDSHIRE, a county of England, deriving its name from Hartford, the capital; and that from the harts with which it anciently abounded, being then over-run with woods. It is bounded on the east by Essex, on the west by Bedfordshire and Buckinghamshire, on the south by Middlesex, and on the north by Cambridgeshire. This county is much indented by those that surround it: the longest part is about 30 miles, the broadest about 24, and 130 in compass; in which are contained about 451,000 acres, 18 market-towns, 120 parishes, and above 95,000 inhabitants, who send six members to parliament, viz. two for the shire, two for Hartford, and two for St Alban's. Before the reign of queen Elizabeth, one sheriff served both for this shire and Essex; but in the ninth year of her reign, it had one allotted for itself. With regard to ecclesiastical jurisdiction, it belongs partly to the diocese of Lincoln, and partly to that of London.

Though the soil in general, especially in the Chiltern and southern parts, is but very indifferent, and much inferior to that of the neighbouring counties; yet the air is so much superior, that lands in this shire generally sell at three or four years purchase more than in many others, on that account. But it must be

Hartford
Hartlepool.

owned, that the foil of Hartfordshire has been much improved of late, by draining, sowing grafs-seeds, and other methods. There are few or no manufactures in the county; but its markets are much frequented, in consequence of its being near London, for malt and all sorts of grain, which, with the many thoroughfares through it, make ample amends.

HARTFORD, the capital of the county of the same name, signifying, as is commonly thought, the "ford of harts," stands on the river Lea, in W. Long. 7°. N. Lat. 51. 45. In William the Conqueror's time, as we find in doomsday-book, there were 26 burgesses in it. It has a castle upon the Lea, supposed to have been built by Edward the Elder, which Edward III. granted to his son John duke of Lancaster, together with the town and honour of Hartford, that (as it is expressed in the grant) he might keep a house suitable to his quality and have a decent habitation. Here the East-Saxon kings often kept their court; and here, in 673, was held a synod. King Edward the Elder built a village for his tenants, and fortified it with a wall of turf for their defence, which is what was originally meant by a burgh, whence the houses were called *burgages*, and the inhabitants *burgher* or *burgesses*. The manor of this town was an honour and a royal manor, and even the town and castle were held of the king *in capite*; of the latter of which the sheriffs of Hartfordshire and Essex were usually governors. The manor was granted by queen Elizabeth to lord Burleigh, whose descendants still possess it. The town sent members to parliament in Edward I.'s time, but after the seventh of Henry V. the bailiff and burgesses petitioned the parliament to be excused on account of their poverty. It has had several charters and grants of privileges from different kings, particularly several fairs and markets. In Henry VII.'s reign, the standards of weights and measures were ordered to be kept here. Here was anciently a monastery; founded by a nephew of William the Conqueror's, and five churches, which are now reduced to two. As the town is remarkable for its pleasant dry situation and wholesome air, the governors of Christ's-hospital have fitted up a large building for the reception of their sickly or supernumerary children. It is governed at present by a mayor, high-steward, recorder, nine aldermen, a town-clerk, chamberlain, 10 capital burgesses, and 16 assistants; and it has two sergeants at mace. Its markets are very considerable for wool, wheat, and malt; of which, especially the last, great quantities are conveyed to London by the river Lea. The town has had a great many benefactors; but to particularize them and their benefactions, would require more room than we can allow. It gives the title of earl to the noble family of Seymour-Conway.

HARTLAND, a town in Devonshire, near the Bristol channel, with a market on Saturdays, much frequented by the people of Cornwall, who come hither in boats. It gives its name to a point, called *Hartland Point*, at the entrance of Bristol channel. W. Lon. 4. 45. N. Lat. 51. 9.

HARTLEPOOL, a sea-port town in the county of Durham. It is commodiously seated on a promontory, and is almost encompassed by the sea. It is an ancient corporation, governed by a mayor and alder-

men, with other subordinate officers. It is at present a pretty large, but poor place. It depends chiefly on the fishing trade; and its harbour is much frequented by colliers passing to and from Newcastle. W. Lon. o. 55. N. 54. 40.

HARTLEY (David), M. A. born at Ilingworth, where his father was curate, received his academical education at Jesus college, Cambridge, of which he was a fellow. He first began to practise physic at Newark, in Nottinghamshire; from whence he removed to St Edmund's Bury, in Suffolk. After this, he settled for some time in London; and lastly went to live at Bath, where he died in 1757, aged 53, leaving two sons and a daughter. He published "A view of the present evidence for and against Mrs Stephens's * medicines as a solvent for the stone, containing 155 cases, with some experiments and observations;" London, 1739.

* See Stephens's Medicines.

He is said to have also written against Dr Warren, of St Edmund's Bury, in defence of inoculation; and some letters of his are to be met with in the Philosophical Transactions.—The doctor was certainly a man of learning, and reputed a good physician; but too fond of nostrums.

But his most considerable literary production is a work entitled, "Observations on man, his frame, his duty, and his expectations, in two parts;" London, 1749, 2 vols, 8vo. The first part contains observations on the frame of the human body and mind, and on their mutual connexions and influences. The second part contains observations on the duty and expectations of mankind.

HARTMAN (John Adolphus), a learned divine and historian, was born at Munster in 1680. After being a Jesuit for several years, he became a Calvinist, at Cassel, in 1715, and soon after was made professor of philosophy and poetry, and in 1722 professor of history and eloquence at Marburg, where he died in 1744. The most esteemed of his works are, 1. The state of the sciences at Hesse, in German. 2. *Historia Hassiaca*, 3 vols. 3. *Præcepta eloquentiæ rationalis*, &c.

He ought not to be confounded with *George Hartman*, a German mathematician, who, in 1540, wrote a book on perspective; nor with *Wolfgang Hartman*, who, in 1506, composed the Annals of Augsburg.

HARUSPICES, pretenders to divination by certain signs, or omens, among the Romans.—The Roman haruspices were at first all taken from Etruria, where their art had most credit. Afterwards young Romans were sent into Etruria, in order to be brought up in the science. It consisted in foretelling future events by attending to various circumstances of the victims. First, It was an ill omen when the victim would not come to the altar without dragging, when it broke its rope, fled away, avoided the stroke, struggled much after it, made a great bellowing, was long a-dying, or bled but little. Secondly, Prefaces were drawn from inspecting the noble parts of the victim when opened; as the heart, lungs, spleen, and especially the liver. If all these were found, if the top of the liver was large and well-made, and if its fibres were strong, it presaged well for the affair in question. Thirdly, Knowledge was also drawn by the haruspices from the manner in which the fire consumed the

Hartley
Haruspices.

victim. If the flame brightened immediately, was pure and clear, rose up in a pyramid without noise, and did not go out till the victim was consumed, these were happy signs. Fourthly, The smoke also was considered, whether it whirled about in curls, or spread itself to the right or the left, or gave a smell different from the common one of broiled meat. Fifthly, it was a lucky omen if the incense they burned melted all at once, and gave a most agreeable smell.

HARSPICY. See **HARSPICES** and **DIVINATION**.
HARVEY (Dr William), an eminent English physician in the 17th century, was incorporated Doctor of physic in Cambridge, afterwards admitted into the college of physicians in London, and was appointed lecturer of anatomy and chirurgery in that college. In these lectures he opened his discovery relating to the circulation of the blood; which, after a variety of experiments, he communicated to the world in his *Exercitationes anatomicae de motu cordis et sanguinis*. He was physician to king James I. and to king Charles I. and adhered to the royal cause. His works have eternized his memory. In 1651, he published his *Exercitationes de generatione animalium*, a very curious work; but it would have been more so, had not his papers been destroyed during the civil wars. In 1654, he was chosen president of the college of physicians in his absence: but his age and weakness were so great, that he could not discharge the duty of that office; and, therefore, desired them to choose Dr Pringle. As he had no children, he settled his paternal estate upon the college. He had three years before built a combination-room, a library, and a museum; and in 1656 he brought the deeds of his estate, and presented them to the college. He was then present at the first feast, instituted by himself, to be continued annually, together with a commemoration speech in Latin, to be spoken on the 18th of October, in honour of the benefactors to the college; he having appointed a handsome stipend for the orator, and also for the keeper of the library and museum, which are still called by his name. He died in 1657.

This great physician had the happiness, in his lifetime, to find the clamours of ignorance, envy, and prejudice, against his doctrine, totally silenced, and to see it universally established. It has, by length of time, been more and more confirmed, and every man now sees and knows it from his own experience. It appears to be of the utmost importance in medicine; as it is perhaps impossible to define health and sickness in fewer words, than that the one is a free, and the other an obstructed, circulation.—Dr Harvey was not only an excellent physician, but an excellent man; his modesty, candour, and piety, were equal to his knowledge; the farther he penetrated into the wonders of nature, the more he was inclined to venerate the Author of it.

HARVEST, the time or season of the year in which the corn is ripe, and fit to be taken into barns.

HARVEST-Fly, in zoology, a large four-winged fly of the cicada kind, very common in Italy, and erroneously supposed to be a grasshopper. See **CICADA**.

HARWICH, a town of Essex, in England, situated in E. Lon. 1. 25. N. Lat. 52. 3. It is not large, but is neat and well-built, and is walled and paved with a sort of petrified clay that falls from the cliffs

in the neighbourhood. The harbour or bay is very large, safe, and deep; and is commanded by a strong fort on the Suffolk side, though not in that county. Here is a dock belonging to the government, with all conveniences for building, cleaning, and refitting men of war. A little way from the town, on a high hill called *Beacon-hill*, is a very fine light-house, which is seen at a very great distance, and is very useful on this dangerous coast. At this place the packet-boats that pass between England, Holland, and Germany, are stationed, and the town is much benefited by the passengers. The government, by a charter from king James I. is vested in a mayor, eight aldermen, 24 capital burgesses, the electors, and recorder. The town has also an admiralty jurisdiction within its liberties, and the return of all writs, fines, &c.

HASLEMERE, a town of Surry, in England, seated on the edge of the county next Hampshire, and sends two members to parliament. This borough is governed by a constable; has one church, and about 100 low brick houses in two paved streets. The number of inhabitants is computed at about 4000. W. Lon. 0. 30. N. Lat. 51. 4.

HASSELLT, a handsome town of the United Provinces, in Overijssel, seated on the river Wecht, in E. Lon. 6. 5. N. Lat. 23. 46.

HASSELLT, a town of Germany, in the circle of Westphalia, and in the territory of Liege, situated on the river Demer, in E. Lon. 4. 49. N. Lat. 50. 55.

HASSIDEANS, or **ASSIDEANS**. See **ASSIDEANS**.
HASSOCK, a balm made of rushes, to kneel or rest the feet upon in churches.

HASP and **STAPLE**, in Scots law, the symbol commonly used in burgh tenements for entering and infesting an heir, by delivering into his hands the hasp and staple of the door.

HASTATED LEAF. See **BOTANY**, p. 2196.

HASTINGS, a town of Suffex, in England, situated in E. Lon. 0. 36. N. Lat. 50. 50.—This town is remarkable for a battle fought in its neighbourhood, between Harold king of England, and William duke of Normandy, on the 15th of October 1066, in which the former was defeated and killed, and by his death, William, surnamed the *Conqueror*, became king of England. See **ENGLAND**, n° 85.—The night before the battle, the aspect of things was very different in the two camps. The English spent the time in riot, jollity, and disorder; the Normans in silence and prayer, and in the other duties of religion. The next day both armies prepared for battle. The duke divided his army into three lines: the first, headed by Montgomery, consisted of archers and light-armed infantry: the second, commanded by Martel, was composed of his bravest battalions, heavy-armed, and ranged in close order: his cavalry, at whose head he placed himself, formed the third line; and were so disposed, that they stretched beyond the infantry; and flanked each wing of the army. He ordered the signal of battle to sound; and the whole army, moving at once, and singing the hymn or song of Roland the famous peer of Charlemagne, advanced, in order and with alacrity, towards the enemy.

Harold had seized the advantage of a rising ground, and having besides drawn some trenches to secure his flanks, he resolved to stand upon the defensive, and to avoid

avoid all action with the cavalry, in which he was inferior. The Kentish men were placed in the van, a post which they had always claimed as their due; the Londoners guarded the standard; and the king himself, accompanied by his two valiant brothers, Gurth and Leofwin, dismounting from horseback, placed himself at the head of his infantry, and expressed his resolution to conquer or to perish in the action. The first attack of the Normans was desperate, but was received with equal valour by the English: and after a furious combat, which remained long undecided, the former, overcome by the difficulty of the ground, and hard pressed by the enemy, began first to relax their vigour; then to give ground; and confusion was spreading among the ranks, when William, who found himself on the brink of destruction, hastened, with a select band, to the relief of his dismayed forces. His presence restored the action; the English were obliged to retreat with loss; and the duke, ordering his second line to advance, renewed the attack with fresh forces and with redoubled courage. Finding that the enemy, aided by the advantage of ground, and animated by the example of their prince, still made a vigorous resistance, he tried a stratagem, which was very delicate in its management, but which seemed advisable in his desperate situation, when, if he gained not a decisive victory, he was totally undone: he commanded his troops to make a hasty retreat, and to allure the enemy from their ground by the appearance of flight. The artifice succeeded against these unexperienced troops, who, heated by the action, and sanguine in their hopes, precipitantly followed the Normans into the plain. William gave orders, that at once the infantry should face about upon their pursuers, and the cavalry make an assault upon their wings, and both of them pursue the advantage which the surprize and terror of the enemy must give them in that critical and decisive moment. The English were repulsed with great slaughter, and drove back to the hill; where being rallied again by the bravery of Harold, they were able, notwithstanding their loss, to maintain the post and continue the combat. The duke tried the same stratagem a second time with the same success; but even after this double advantage, he still found a great body of the English, who, maintaining themselves in firm array, seemed determined to dispute the victory to the last extremity. He ordered his heavy-armed infantry to make the assault upon them; while his archers, placed behind, should gall the enemy, who were exposed by the situation of the ground, and who were intent in defending themselves against the swords and spears of the assailants. By this disposition he at last prevailed; Harold was slain by an arrow, while he was combating with great bravery at the head of his men. His two brothers shared the same fate: and the English, discouraged by the fall of these princes, gave ground on all sides, and were pursued with great slaughter by the victorious Normans. A few troops, however, of the vanquished dared still to turn upon their pursuers; and taking them in deep and miry ground, obtained some revenge for the slaughter and dishonour of the day. But the appearance of the duke obliged them to seek their safety by flight, and darkness saved them from any farther pursuit by the enemy.

Thus was gained by William, Duke of Normandy, the great and decisive victory of Hastings, after a battle which was fought from morning till sunset, and which seemed worthy, by the heroic feats of valour displayed by both armies, and by both commanders, to decide the fate of a mighty kingdom. William had three horses killed under him; and there fell near fifteen thousand men on the side of the Normans. The loss was still more considerable on that of the vanquished; besides the death of the king and his two brothers. The dead body of Harold was brought to William, and was generously restored without ransom to his mother.

The town of Hastings is the chief of the cinque-ports; and was formerly obliged to find 21 ships, within 40 days after the king's summons, well furnished and armed for service, and to maintain the crews a fortnight at its own charge. It sends two members to parliament, and supplies London with abundance of fish. It lies between a high cliff towards the sea, and a high hill on the land-side, having two streets, and two parish-churches. About the year 1377 this town was burnt by the French; and, when it was rebuilt, it was divided into two parishes. There was a castle on the hill which overlooked the town, but it is now in ruins.

HAT, a covering for the head, worn by the men in most parts of Europe. Those most in esteem are made of the pure hair of the castor or beaver; for they are also made of the hair or wool of divers other animals, and that by much the same process.

Hats are said to have been first seen about the year 1400; at which time they became of use for country wear, riding, &c.—Father Daniel relates, that when Charles II. made his public entry into Rouen in 1449, he had on a hat lined with red-velvet, and surmounted with a plume or tuft of feathers.—He adds, that it is from this entry, at least under this reign, that the use of hats and caps is to be dated, which henceforward began to take place of the chaperons and hoods that had been wore before.

In progress of time, from the laity, the clergy likewise took the habit; but it was looked on as a crying abuse, and several regulations were published, forbidding any priest, or religious person, to appear in a hat without cornets; and enjoining them to keep to the use of chaperons, made of black cloth, with decent cornets: if they were poor, they were at least to have cornets fastened to their hats, and this upon pain of suspension and excommunication.—Indeed the use of hats is said to have been of a longer standing among the ecclesiastics of Brittany by 200 years, and especially among the canons: but these were no other than a kind of caps; and it was from hence arose the square caps worn in colleges, &c. Lobineau * observes, that a bishop of Dol, in the 12th century, zealous for good, order, allowed the canons alone to wear such hats; enjoining, that if any other person should come with them to church, divine service should immediately stand still.

Method of Making Hats. To make the beaver-hats, they tear off the long and short hair from the skin, with knives suitable to the occasion: after which they proportion the quantity of the several sorts of beaver-hair, by mixing one third of the dry castor to two thirds.

* Tom. I. P. 845.

thirds of *old-coat*, which is a term for a skin that has been worn some time by the Indians of America, who catch and sell them to the Europeans. The hair, so mixed, is carded and weighed out into parcels, according to the size and thickness of the hat intended. The stuff is now laid on the hurdle, with an instrument called a *bow*, resembling that of a violin, but larger; whose string being worked with a small bow-flick, and made to play on the furs, they fly, and mix themselves together, the dust and filth at the same time passing through the chinks. Instead of a bow, some hat-makers use a searce of hair, through which they pass the stuff. Thus hats are formed of an oval figure, ending with an acute angle at the top: with what stuff remains, they strengthen them where slenderest, yet designedly make them thicker in the brim near the crown, than towards the circumference, or in the crown itself. They next harden the stuff, so managed, into more compact flakes, by pressing down a hardened leather upon it. This done, they are carried to the bason; upon which laying one of the hardened hats, they sprinkle it over with water, and mould it; and the heat of the fire, with the water and pressing, embody the stuff into a slight hairy sort of felt: after which, turning up the edges all round over the mould, they lay it by, and proceed with another; which being in like manner reduced to the same consistence and form, they are both joined together, so as to make them meet in an angle at top, making only one conical cap. The next process is to remove the hat to a trough, resembling a mill-hopper, which is a copper kettle filled with water and grounds, kept hot for the purpose; and, after being dipped in the kettle, the hat is laid on the sloping side, called the *plank*. Here they proceed to work it, by rolling and unrolling it again and again, one part after another, first with the hand, and afterwards with a small wooden roller, taking care to dip it from time to time; till at length, by thus fulling and thickening it four or five hours, it is brought to the dimensions intended. In this violent labour, the workmen usually guard their hands with thick leather, which they call *gloves*. The hat thus wrought into the form of a conical cap, is reduced into proper shape on a block of the size of the intended crown, by tying it round with a string, called a *commander*; after which, with a bent iron called a *flamper*, they gradually beat down the commander all round, till it has reached the bottom of the block, and what remains at the bottom below the string forms the brim. In this station it is set to dry; and is afterwards singed, by holding it over the blaze of a fire made of straw or shavings: it is then rubbed with pumice-stone, to take off the coarser nap; then rubbed over with seal-skin, to lay the nap still finer; and, lastly, carded with a fine card, to raise the fine cotton with which the hat is to appear when finished: then sitting it to the block, they tie it, cut round the edges, and deliver it to the dyers. The dye being completed, the hat is dyed by being hung in the roof of a stove heated with a charcoal-fire: and, when dry, it is stiffened with melted glue, or rather gum senega, which is smeared over the hat with a brush, and rubbed in with the hand. Then, having spread a cloth over the steaming bason, which is a little fire-place raised about three feet high, with an iron plate laid over it, exactly

covering the fire, the hat is laid upon the cloth, with the brim downwards, the cloth being first sprinkled with water, to raise a strong steam, to force in the stiffening. When it is moderately hot, the workman strikes gently on the brim, with the flat of his hand, to make the joinings incorporate and bind so as not to appear, turning it from time to time, and at last letting it on the crown. And when it has been sufficiently steamed and dried, it is put again on the block, brushed, ironed, well smoothed, and fitted for lining.

Hats make a considerable article in commerce: England supplies Spain, Portugal, Italy, and Germany, with extraordinary quantities of them; and as our manufacturers have the reputation of making the best hats in Europe, their importation is prohibited.

Hats are also made for womens wear, of chips, straw, or cane, by plating, and sewing the plats together; beginning with the centre of the crown, and working round till the whole is finished. Hats for the same purpose are also wove and made of horse-hair, silk, &c.

HAT is also figuratively used for the dignity of cardinal, or a promotion to that dignity. In this sense they say, "to expect the hat; to claim, or have pretensions to, the hat," &c.

Pope Innocent IV. first made the hat the symbol or cognizance of the cardinals, enjoining them to wear a red hat at the ceremonies and processions, in token of their being ready to spill their blood for Jesus Christ.

Dyeing of Hats. The instructions of Mr Colbert direct hats to be first strongly galled, by boiling them a long time in a decoction of galls with a little logwood, that the dye may penetrate the better into their substance; after which a proper quantity of vitriol, and decoction of logwood, with a little verdigrease, are added, and the hats continued in this mixture also for a considerable time. They are afterwards to be put in a fresh liquor of logwood, galls, vitriol, and verdigrease; and where the hats are of great price, or of a hair which difficultly takes the dye, the same process is to be repeated a third time. For obtaining the most perfect colour, the hair or wool is to be dyed blue, previously to its being formed into hats.—The present practice is more compendious, and affords, as we may daily see, a very good black. According to Dr Lewis, it does not materially differ from that of the *Encyclopédie*, which is as follows.

An hundred pounds of logwood, 12 pounds of gum, and six pounds of galls, are boiled in a proper quantity of water for some hours; after which, about six pounds of verdigrease, and ten of green vitriol, are added, and the liquor kept just simmering, or of a heat a little below boiling. Ten or twelve dozen of hats are immediately put in, each on its block, and kept down by cross bars for about an hour and an half: they are then taken out and aired, and the same number of others put in their room. The two sets of hats are thus dipped and aired alternately, eight times each; the liquor being refreshed each time with more of the ingredients, but in less quantity than at first.

This process (says Dr Lewis) affords a very good black on woollen and silk stuffs as well as on hats, as we may see in the small pieces of both kinds which are sometimes dyed by the hatters. The workmen lay great stress upon the verdigrease, and affirm that they can-

Hatch
Hatching.

cannot dye a black hat without it: it were to be wished that the use of this ingredient were more common in the other branches of the black dye; for the hatters dye, both on silk and woollen, is reckoned a finer black than what is commonly produced by the woollen and silk dyes.

HATCH, or **HATCHWAY**, a square or oblong opening in the **DECK** of a ship, of which there are several, forming the passages from one deck to another, and into the hold, or lower apartments. See Plate LXXXVIII. where **A** represents the main hatchway of the lower deck; **NN** the fore-hatchway; and **OO** the after-hatchway.—There are likewise hatches of a smaller kind, called *scuttles*. See **UU** in the same figure; as also the article **SCUTTLE**.—Hatches is also, though improperly, a name applied by sailors to the covers or lids of the hatchway.

HATCHES, in mining, a term used in Cornwall, to express any of the openings of the earth either into mines or in search of them. The fruitless openings are called *effay-hatches*; the real mouths of the veins, *tin hatches*; and the places where they wind up the buckets of ore, *wind hatches*.

HATCHES also denote flood-gates set in a river, &c. to stop the current of the water, particularly certain dams or mounds made of rubbish, clay, or earth, to prevent the water that issues from the stream-works and tin-washes in Cornwall from running into the fresh rivers.

HATCHET, a small light sort of an axe, with a basil-edge on its left side, and a short handle, as being to be used with one hand.—Hatchets are used by various artificers, and more particularly in hewing of wood.

HATCHING, the maturing fecundated eggs, whether by the incubation and warmth of the parent bird, or by artificial heat, so as to produce young chickens alive.

The art of hatching chickens by means of ovens has long been practised in Egypt; but it is there only known to the inhabitants of a single village named *Berne*, and to those that live at a small distance from it. Towards the beginning of autumn they scatter themselves all over the country; where each person among them is ready to undertake the management of an oven, each of which is of a different size; but, in general, they are capable of containing from forty to fourscore thousand eggs. The number of these ovens placed up and down the country is about 386, and they usually keep them working for about six months: as, therefore, each brood takes up in an oven, as under a hen, only 21 days, it is easy in every one of them to hatch eight different broods of chickens. Every *Bermean* is under the obligation of delivering to the person who intrusts him with an oven, only two thirds of as many chickens as there have been eggs put under his care; and he is a gainer by this bargain, as more than two thirds of the eggs usually produce chickens. In order to make a calculation of the number of chickens yearly so hatched in Egypt, it has been supposed that only two thirds of the eggs are hatched, and that each brood consists of at least 30,000 chickens; and thus it would appear, that the ovens of Egypt give life yearly to at least 92,640,000 of these animals.

This useful and advantageous method of hatching

eggs has been lately discovered in France, by the ingenious Mr Reaumur; who, by a number of experiments, has reduced the art to certain principles. He found by experience, that the heat necessary for this purpose is nearly the same with that marked 32 on his thermometer, or that marked 96 on Fahrenheit's. This degree of heat is nearly that of the skin of the hen, and, what is remarkable, of the skin of all other domestic fowls, and probably of all other kinds of birds. The degree of heat which brings about the development of the cygnet, the gosling, and the turkey-pout, is the same as that which fits for hatching the canary-long-flier, and, in all probability, the smallest humming-bird: the difference is only in the time during which this heat ought to be communicated to the eggs of different birds; it will bring the canary bird to perfection in 11 or 12 days, while the turkey-pout will require 27 or 28.

After many experiments, Mr Reaumur found, that stoves heated by means of a baker's oven, succeeded better than those made hot by layers of dung: and the furnaces of glass-houses and those of the melters of metals, by means of pipes to convey heat into a room, might, no doubt, be made to answer the same purpose. As to the form of the stoves, no great nicety is required. A chamber over an oven will do very well. Nothing more will be necessary but to ascertain the degree of heat; which may be done by melting a lump of butter of the size of a walnut, with half as much tallow, and putting it into a phial. This will serve to indicate the heat with sufficient exactness: for when it is too great, this mixture will become as liquid as oil; and when the heat is too small, it will remain fixed in a lump: but it will flow like a thick syrup, upon inclining the bottle, if the stove be of a right temper. Great attention therefore should be given to keep the heat always at this degree, by letting in fresh air if it be too great, or shutting the stove more close if it be too small: and that all the eggs in the stove may equally share the irregularities of the heat, it will be necessary to shift them from the sides to the centre; thereby imitating the hens, who are frequently seen to make use of their bills, to push to the outer parts those eggs that were nearest to the middle of their nests, and to bring into the middle such as lay nearest the sides.

Mr Reaumur has invented a sort of low boxes, without bottoms, and lined with furs. These, which he calls *artificial-parents*, not only shelter the chickens from the injuries of the air, but afford a kindly warmth, so that they presently take the benefit of their shelter as readily as they would have done under the wings of a hen. After hatching, it will be necessary to keep the chickens, for some time, in a room artfully heated and furnished with these boxes; but afterwards they may be safely exposed to the air in the court-yard, in which it may not be amiss to place one of these artificial-parents to shelter them if there should be occasion for it.

As to the manner of feeding the young brood, they are generally a whole day after being hatched, before they take any food at all; and then a few crumbs of bread may be given them for a day or two, after which they will begin to pick up insects and grubs for themselves.

But to save the trouble of attending them, capons may

Hatching.

Hatching
Havana.

may be taught to watch them in the same manner as hens do. Mr Reaumur affures us, that he has seen above 200 chickens at once, all led about and defended only by three or four such capons. Nay, cocks may be taught to perform the same office; which they, as well as the capons, will continue to do all their lives after.

HATCHING, or **HACHING**, in designing, &c. the making of lines with a pen, pencil, graver, or the like; and the intersecting or going across those lines with others drawn a contrary way, is called *counter-hatching*. The depths and shadows of draughts are usually formed by hatching.

Hatching is of singular use in heraldry, to distinguish the several colours of a shield, without being illumined: thus, gules or red is hatched by lines drawn from the top to the bottom; azure, by lines drawn across the shield; and so of other colours.

HATCHMENT, in heraldry, the coat-of-arms of a person dead, usually placed on the front of a house, whereby may be known what rank the deceased person was of when living: the whole distinguished in such a manner as to enable the beholder to know, whether he was a bachelor, married man, or widower; with the like distinctions for women.

HATFIELD, a town in Hertfordshire in England. The kings of England had formerly a royal palace here, where Edward VI. was educated. King James I. exchanged the manor with Sir Robert Cecil, afterwards earl of Salisbury, for Theobalds, in the parish of Cheshunt in this country; and the lordship still remains in that noble family, who have a very fine seat here. The rectory, which is in that earl's gift, is reckoned worth 800 pounds a-year. W. Long. O. 12. N. Lat. 51. 42.

HATFIELD-BROAD-OAK, a town of Essex in England, seated on a branch of the river Lea, in E. Long. O. 13. N. Lat. 51. 58.

HATTEM, a town of the United Provinces in the duchy of Guelderland, seated on the river Uffel, in E. Lon. 6. O. N. Lat. 53. 30.

HATTOCK, a shock of corn containing twelve sheaves; others make it only three sheaves laid together.

HATUAN, a town and fort of Upper Hungary in the county of Novigrod. It was taken by the Imperials in 1685. It is seated on a mountain, in E. Long. 19. 48. N. Lat. 47. 52.

HAVANNA, a sea-port town of America, in the island of Cuba, and on the north-west part of it, opposite to Florida. It is famous for its harbour, which is so large that it may hold 1000 vessels; and yet the mouth is so narrow, that only one ship can enter at a time. This is the place where all the ships that come from the Spanish settlements rendezvous on their return to Spain. It is near two miles in circumference; and contains about 10,000 inhabitants, consisting of Spaniards, Mulattoes, and Negroes. The entrance into the harbour is well defended by forts and platforms of great guns; and the bishop of St Jago resides here, as well as most men of fashion and fortune belonging to the island. It was taken by the British in 1762; but restored to the Spaniards by the treaty of peace in 1763. W. Long. 84. 10. N. Lat. 23. O.

HAVEL, a river of Brandenburg, which proceeds

from a lake in the duchy of Mecklenburg, and running thro' the middle Marche, and thro' Brandenburg and other towns, runs north, and falls into the Elbe.

HAVELBERG, a town of Germany, in the circle of Lower Saxony, and in the electorate of Brandenburg, with a bishop's see, secularized in favour of the house of Brandenburg. It is seated on the river Havel, in E. Long. 12. 43. N. Lat. 53. 4.

HAVEN, a sea-port or harbour. See **HARBOUR**.

HAVERCAMP (Sigibert), a celebrated Dutch scholar and critic, professor of history, eloquence, and the Greek tongue, at Leyden. He was particularly skilled in medals; and was the author of some esteemed works in that way, beside giving good and elegant editions of several Greek and Latin authors. He died at Leyden in 1742, aged 58.

HAVERFORD-WEAST, a town of Pembrokehire in South Wales, seated in W. Long. 5. N. Lat. 51. 50. It is a town and county of itself; and stands commodiously on the side of a hill, and on a creek of Milford-haven, over which there is a stone bridge. It is a large handsome place, with several good houses, and contains three parish-churches. It has also a considerable trade, with several vessels belonging to it; and sends one member to parliament. The assizes and county-gaol are kept here; and it had once a wall and castle, now demolished.

HAVERILL, a town of England, in the county of Suffolk, where there is a considerable manufactory of checks, cottons, and stuffs. By the ruins of a church and castle still to be seen, it appears to have been formerly a place of much greater consequence than at present. It has now only about 300 poor clay-houses, and one wide street not paved.

HAUL, an expression peculiar to seamen, implying to pull a single rope, without the assistance of blocks or other such mechanical powers. When a rope is otherwise pulled, as by the application of tackles, or the connection with blocks, &c. the term is changed into *hoisting*.

To *HAUL the Wind*, is to direct the ship's course nearer to that point of the compass from which the wind arises. Thus, supposing a ship to sail south-west, with the wind northerly, and some particular occasion requires to haul the wind more westward; to perform this operation, it is necessary to arrange the sails more obliquely with her keel; to brace the yards more forward, by slackening the starboard, and pulling in the larboard braces, and to haul the lower sheets further aft; and finally, to put the helm a-port, i. e. over to the larboard side of the vessel. As soon as her head is turned directly to the westward, and her sails are trimmed accordingly, she is said to have hauled the wind four points; that is to say, from south-west to west. She may still go two points nearer to the direction of the wind, by disposing her sails according to their greatest obliquity, or, in the sea-phraze, by *trimming all sharp*; and in this situation she is said to be close hauled, as sailing west north-west.

HAUNCH, or **HANCH**, the *Hip*, or that part of the body between the last ribs and the thigh.

The haunches of a horse are too long, if when standing in the stable he limps, with his hind-legs farther back than he ought; and when the top or onset of his tail is not in a perpendicular line to the tip of his

Havelberg
Hanch.

Havre
Hautc.

his hocks, as it always does in horses whose haunches are of a just length. There are some horses, which though they have too long haunches, yet commonly walk well: such are good to climb hills, but are not at all sure upon a descent; for they cannot ply their hams, and never gallop slowly, but always nearly upon a full speed. The art of riding the great horse has not a more necessary lesson than that of putting a horse upon his haunches; which, in other words, is called *coupling him well*, or putting him well together, or compact. A horse that cannot bend or lower his haunches, throws himself too much upon his shoulder, and lies heavy upon the bridle.

HAVRE de GRACE, a sea-port town of France, and capital of a district of the same name, is seated in the province of Normandy, on the English channel, in a large plain at the mouth of the river Seine. It is a small fortified town, nearly of a square figure, divided into two parts by the harbour, surrounded with a wall and other works, and defended by a very strong citadel. It is one of the most important places in France, on account of its foreign trade and convenient harbour; for which reason it was made a distinct government from the rest of Normandy. It was surprised in 1562, by the Protestants, who delivered it to queen Elizabeth; but it was lost next year. In 1694 it was bombarded by the English, and also in the year 1758. E. Long. c. 11. N. Lat. 49. 29.

HAURIANT, in heraldry, a term peculiar to fishes; and signifies their standing upright, as if they were refreshing themselves by sucking in the air.

HAUTE FEUILLE (John), an ingenious mechanic born at Orleans in 1647. Though he embraced the state of an ecclesiastic, and enjoyed several benefices, he applied almost his whole life to mechanics, in which he made a great progress. He had a particular taste for clock-work, and made several discoveries in it that were of singular use. It was he who found out the secret of moderating the vibration of the balance by means of a small steel-spring, which has since been made use of. This discovery he laid before the members of the Academy of Sciences in 1674; and these watches are, by way of eminence, called *pendulum-watches*; not that they have real pendulums, but because they nearly approach to the justness of pendulums. M. Huygens perfected this happy invention; but having declared himself the inventor, and obtained from Lewis XIV. a patent for making watches with spiral springs, the abbé Feuille opposed the registering of this privilege, and published a piece on the subject against M. Huygens. He wrote a great number of other pieces, most of which are small pamphlets consisting of a few pages, but very curious; as, 1. His perpetual pendulum, quarto. 2. New inventions, quarto. 3. The art of breathing under water, and the means of preserving a flame shut up in a small place. 4. Reflections on machines for raising water. 5. His opinion on the different sentiments of Mallebranche and Regis relating to the appearance of the moon when seen in the horizon. 6. The magnetic balance. 7. A plaacet to the king on the longitude. 8. Letter on the secret of the longitude. 9. A new system on the flux and reflux of the sea. 10. The means of making sensible experiments that prove the motion of the earth; and many other pieces. He

VOL. V.

died in 1724.

HAUTBOY, a musical instrument of the wind kind, shaped much like the lute; only that it spreads and widens towards the bottom, and is sounded thro' a reed. The treble is two feet long; the tenor goes a fifth lower, when blown open: it has only eight holes; but the bass, which is five feet long, has eleven.

The word is French, *haut bois*, q. d. *high wood*; and is given to this instrument because the tone of it is higher than that of the violin.

HAW, a sort of berry, the fruit of several species of *mespilus*, thence denominated *hawthorn*. See *MESPILUS*.

HAW, among farriers, an excrescence resembling a gristle, growing under the nether eye-lid and eye of a horse, which, if not timely removed, will put it quite out. See *FARRIER*, § xi. 15.

Haw, a small parcel of land so called in Kent, as a *Hemphaw*, or *Beanhaw*, lying near the house, and inclosed for these uses. But Sir Edward Coke, in an ancient plea concerning Feverham in Kent, says *Hawes* are houses.

Haw-Finch. See *LOXIA*.

HAWGH, or *HOWGH*, signifies a green plot in a valley, as they use it in the north of England.

HAWK, in ornithology. See *FALCO*.

HAWKERS, anciently were fraudulent persons, who went about from place to place buying and selling brass, pewter, and other merchandize, which ought to be uttered in open market. In this sense the word is mentioned *anno 25 Hen. VIII. c. 6.* and 33 *ejusdem, c. 4.*—The appellation *hawkers* seems to have arisen from their uncertain wandering, like those who with hawks seek their game where they can find it.

HAWKERS, is also now applied to those who go up and down London streets crying new books, and selling them by retail. The women who furnish the hawkers, i. e. sell the papers by wholesale from the press, are called *mercuries*.

HAWKING, the exercise of taking wild-fowl by means of hawks. The method of reclaiming, training, and bringing up a hawk to this exercise, is called *falconry*. See *FALCONRY*.

There are only two countries in the world where we have any evidence that the exercise of hawking was very anciently in vogue. These are, Thrace and Britain. In the former, it was pursued merely as the diversion of a particular district, if we may believe Pliny†, whose account is rendered obscure by the darkness of his own ideas of the matter. The primitive Britons, with a fondness for the exercise of hunting, had also a taste for that of hawking; and every chief among them maintained a considerable number of birds for that sport. It appears also from a curious passage in the poems of Ossian*, that the same diversion was fashionable at a very early period in Scotland. The poet tells us, that a peace was endeavoured to be gained by the proffer of 400 managed steeds, 100 foreign captives, and “100 hawks with fluttering wings, that fly ‘across the sky.” To the Romans this diversion was scarce known in the days of Vespasian; yet it was introduced immediately afterwards. Most probably they adopted it from the Britons; but we certainly know that they greatly improved it by the introduction of spaniels into the island. In this state it appears among

Hautboy
Hawking.

† l. x. 8.

* Vol. I. p. 115.

Hawking.

Hawking.

Maddox
Antiquit.
Exchequer.
1.469, 476.Blunt's
Anc. Te-
nures. 200.

the Roman Britons in the sixth century. Gildas, in a remarkable passage in his first epistle, speaks of Maglocunus, on his relinquishing the sphere of ambition, and taking refuge in a monastery; and proverbially compares him to a dove, that hastens away at the noisy approach of the dogs, and with various turns and windings takes her flight from the talons of the hawk.

In after-times, hawking was the principal amusement of the English: a person of rank scarce stirred out without his hawk on his hand; which, in old paintings, is the criterion of nobility. Harold, afterwards king of England, when he went on a most important embassy into Normandy, is painted embarking with a bird on his fist, and a dog under his arm: and in an ancient picture of the nuptials of Henry VI. a nobleman is represented in much the same manner; for in those days, it was thought sufficient for noblemen to *visit their born, and to carry their hawk fair, and leave study and learning to the children of mean people.* The former were the accomplishments of the times; Spenser makes his gallant Sir Trillem boast,

Ne is there hawk which mantleth her on perch,

Whether high towing, or descending low,

But I the measure of her flight doe feare,

And all her prey, and all her diet know. B. vi. Canto 2.

In short, this diversion was, among the old English, the pride of the rich, and the privilege of the poor; no rank of men seems to have been excluded the amusement: we learn from the book of St Alban's, that every degree had its peculiar hawk, from the *emperor down to the holy-water clerk.* Vast was the expence that sometimes attended this sport. In the reign of James I. Sir Thomas Monson is said to have given 1000*l.* for a cast of hawks: we are not then to wonder at the rigour of the laws that tended to preserve a pleasure that was carried to such an extravagant pitch. In the 34th of Edward III. it was made felony to steal a hawk; to take its eggs, even in a person's own ground, was punishable with imprisonment for a year and a day, besides a fine at the king's pleasure: in queen Elizabeth's reign, the imprisonment was reduced to three months; but the offender was to find security for his good behaviour for seven years, or lie in prison till he did. Such was the envious state of the times of old England: during the whole day the gentry were given to the fowls of the air, and the beasts of the field; in the evening, they celebrated their exploits with the most abandoned and brutish foolishness; at the same time, the inferior rank of people, by the most unjust and arbitrary laws, were liable to capital punishments, to fines, and loss of liberty, for destroying the most noxious of the feathered tribe.

According to Olearius, the diversion of hawking is more followed by the Tartars and Persians, than ever it was in any part of Europe. *Il n'y avoit point de butte (says he) qui n'eust son aigle ou son faucon.*

The falcons or hawks that were in use in these kingdoms, are now found to breed in Wales, and in North-Britain and its isles. The peregrine falcon inhabits the rocks of Caernarvonshire. The same species, with the gyrfalcon, the gentill, and the goshawk, are found in Scotland, and the lammer in Ireland.

We may here take notice, that the Norwegian breed was, in old times, in high esteem in England: they

were thought bribes worthy a king. Geoffrey Fitz-pierre gave two good Norway hawks to king John, to obtain for his friend the liberty of exporting 100 wt. of cheese; and Nicholas the Dane was to give the king a hawk every time he came into England, that he might have free liberty to traffic throughout the king's dominions.

They were also made the tenures that some of the nobility held their estates by, from the crown. Thus Sir John Stanley had a grant of the Isle of Man from Henry IV. to be held of the king, his heirs and successors, by homage and the service of two falcons, payable on the day of his or their coronation. And Philip de Halting held his manor of Combertoun in Cambridgeshire, by the service of keeping the king's falcons.

Hawking, though an exercise now much disused among us, in comparison of what it anciently was, does yet furnish a great variety of significant terms, which still obtain in our language. Thus, the parts of a hawk have their proper names.—The legs, from the thigh to the foot, are called *arms*; the toes, the *petty-fingers*; the claws, the *pouncers*.—The wings are called the *ails*; the long feathers thereof, the *beams*; the two longest, the *principal feathers*; those next thereto, the *flags*.—The tail is called the *train*; the breast-feathers, the *mails*; those behind the thigh, the *pendant feathers*.—When the feathers are not yet full grown, they are said to be *unfeathered*; when they are complete, they are *summed*.—The craw, or crop, is called the *gorge*.—The pipe next the fundament, where the feces are drawn down, is called the *pannel*.—The slimy substance lying in the pannel, is called the *glut*.—The upper and crooked part of the bill is called the *beak*; the netter-part, the *clap*; the yellow part between the beak and the eyes, the *sear* or *seer*; the two small holes therein, the *naris*.

As to her furniture:—The leathers, with bells buttoned on her legs, are called *bowits*.—The leathern thong, whereby the falconer holds the hawk, is called the *leafe*, or *leash*; the little straps, by which the leafe is fastened to the legs, *jesses*; and a line or pack-thread fastened to the leafe, in disciplining her, a *creance*.—A cover for her head, to keep her in the dark, is called a *hood*; a large wide hood, open behind, to be wore at first, is called a *ruster hood*. To draw the strings, that the hood may be in readines to be pulled off, is called *unstriking the hood*.—The blinding a hawk just taken, by running a thread through her eye-lids, and thus drawing them over the eyes, to prepare her for being hooded, is called *feeling*.—A figure or resemblance of a fowl, made of leather and feathers, is called a *lure*.—Her resting-place, when off the falconer's fist, is called the *perch*.—The place where her meat is laid, is called the *hack*; and that wherein she is fed, while her feathers fall and come again, the *men*.

Something given a hawk, to cleanse and purge her gorge, is called *casting*.—Small feathers given her to make her cast, are called *plumage*.—Gravel given her to help to bring down her stomach, is called *rangle*.—Her throwing up filth from the gorge after casting, is called *gleaming*.—The purging of her greale, &c. *enfeaming*.—A being stuffed is called *gurgiting*.—The inserting a feather in her wing, in lieu of a broken one, is called *imping*.—The giving her a leg, wing, or pinion of a

fowl

Biogr. Brit.
ant. Causton.

Hawking. fowl to pull at, is called *tiring*.—The neck of a bird the hawk preys on, is called the *inke*.—What the hawk leaves of her prey, is called the *pill*, or *pelf*.

There are also proper terms for her several actions.—When the flutters with her wings, as if striving to get away, either from perch or fist, she is said to *bate*.—When, standing too near, they fight with each other, it is called *erabbling*.—When the young ones quiver, and shake their wings in obedience to the elder, it is called *courving*.—When she wipes her beak after feeding, she is said to *seak*.—When the sleeps, she is said to *jouk*.—From the time of exchanging her coat, till the turn white again, is called her *internewing*.—Treading is called *cawking*.—When she stretches one of her wings after her legs, and then the other, it is called *mantling*.—Her dung is called *muting*; when she mutes a good way from her, she is said to *slice*; when she does it directly down, instead of yerking backwards, she is said to *slime*; and if it be in drops, it is called *dropping*.—When she as it were squeezes, it is called *smiting*.—When she raises and shakes herself, she is said to *rouze*.—When, after mantling, she crosses her wings together over her back, she is said to *swable*.

When a hawk seizes, she is said to *bind*.—When, after seizing, she pulls off the feathers, she is said to *plume*.—When she raises a fowl aloft, and at length descends with it to the ground, it is called *trussing*.—When, being aloft, she defends to strike her prey, it is called *flooping*.—When she flies too far from the game, she is said to *rake*.—When, forsaking her proper game, she flies at pyes, crows, &c. that chance to cross her, it is called *check*.—When, missing the fowl, she betakes herself to the next check, she is said to *fly on head*.—The fowl or game she flies at is called the *quarry*.—The dead body of a fowl killed by the hawk, is called a *pelt*.—When she flies away with the quarry, she is said to *carry*.—When in flooping she turns two or three times on the wing, to recover herself ere she seizes, it is called *canceling*.—When she hits the prey, yet does not truss it, it is called *ruff*.—The making a hawk tame and gentle, is called *reclaiming*.—The bringing her to endure company, *manning* her.---An old staunch hawk, used to fly and set example to a young one, is called a *make-hawk*.

The reclaiming, manning, and bringing up a hawk to the sport, is not easy to be brought to any precise set of rules.---It consists in a number of little practices and observances, calculated to familiarize the falconer to his bird, to procure the love thereof, &c. See the article *FALCONRY*.

When your hawk comes readily to the lure, a large pair of luring-bells are to be put upon her; and the more giddy-headed and apt to rake out your hawk is, the larger must the bells be. Having done this, and the being sharp-set, ride out in a fair morning, into some large field, uncumbered with trees or wood, with your hawk on your fist; then having loosened her hood, whistle softly, to provoke her to fly; unhood her, and let her fly with her head into the wind; for by that means she will be the better able to get upon the wing, and will naturally climb upwards, flying a circle. After she has flown three or four turns, then lure her with your voice, calling the lure about your head, having first tied a pullet to it; and if your fal-

con come in, and approach near you, cast out the lure into the wind, and, if she stoop to it, reward her.

You will often find, that when the flies from the fist, she will take stand on the ground: this is a fault which is very common with foar-falcons. To remedy this, fright her up with your wand; and when you have forced her to take a turn or two, take her down to the lure, and feed her. But if this does not do, then you must have in readiness a duck sealed, so that she may see no way but backwards, and that will make her mount the higher. Hold this duck in your hand, by one of the wings near the body; then lure with the voice, to make the falcon turn her head; and when she is at a reasonable pitch, cast your duck up just under her; when, if she strike, stoop, or truss the duck, permit her to kill it, and reward her by giving her a reasonable gorge. After you have practised this two or three times, your hawk will leave the stand, and, delighted to be on the wing, will be very obedient.

It is not convenient, for the first or second time, to shew your hawk a large fowl; for it frequently happens, that they escape from the hawk, and she, not recovering them, rakes after them: this gives the falconer trouble, and frequently occasions the loss of the hawk. But if she happens to pursue a fowl, and, being unable to recover it, gives it over, and comes in again directly, then cast out a sealed duck; and if she stoop and truss it across the wings, permit her to take her pleasure, rewarding her also with the heart, brains, tongue, and liver. But if you have not a quick duck, take her down with a dry lure, and let her plume a pullet and feed upon it. By this means a hawk will learn to give over a fowl that rakes out, and, on hearing the falconer's lure, will make back again, and know the better how to hold in the head.

Some hawks have a disdainful coyness, proceeding from their being high fed: such a hawk must not be rewarded, though she should kill: but you may give her leave to plume a little; and then taking a sheep's heart cold, or the leg of a pullet, when the hawk is busy in pluming, let either of them be conveyed into the body of the fowl, that it may favour of it; and when the hawk has eaten the heart, brains, and tongue of the fowl, take out what is inclosed, call her to your fist, and feed her with it: afterwards give her some of the feathers of the fowl's neck, to scower her, and make her cast.

If your hawk be a stately high-flying one, she ought not to take more than one flight in a morning; and if she be made for the river, let her not fly more than twice: when she is at the highest, take her down with your lure; and when she has plumed and broken the fowl a little, feed her, by which means you will keep her a high-flyer, and fond of the lure.

HAWKWOOD (Sir John), a famous English general, was the son of a tanner at Heddingham-Sibill in Essex, where he was born in the reign of Edward III. He was bound apprentice to a taylor in London; but being fortunately pressed into the army, was sent abroad, where his genius soon expanded itself, and surmounted the narrow prejudices which adhered to his birth and occupation. He signalized himself as a soldier in France and Italy, and particularly at Pisa

Hawke
Hay.

and Florence. He commanded with great ability and success in the army of Galeacio duke of Milan; and was in such high esteem with Barnabas his brother, that he gave him Domitia his natural daughter in marriage, with an ample fortune. He died at Florence, full of years and military fame, in 1394. See (History of) ITALY.

HAWSE, or HAUSE, is generally understood to imply the situation of the cables before the ship's stem, when she is moored with two anchors out from forward, viz. one on the starboard, and the other on the larboard-bow. Hence it is usual to say, *she has a clear hawse, or a foul hawse*. It also denotes any small distance *a-head* of a ship, or between her head and the anchors employed to ride her; as, "He has *" anchored in our hawse, The brig fell athwart our " hawse," &c.*

A ship is said to ride with a clear hawse, when the cables are directed to their anchors, without lying athwart the stem; or crossing, or being twisted round each other by the ship's winding about, according to the change of the wind, tide, or current.

A foul hause, on the contrary, implies that the cables lie across the stem, or bear upon each other, so as to be rubbed and chafed by the motion of the vessel.—The hawse accordingly is foul, by having either a cross, an elbow, or a round turn. If the larboard cable, lying across the stem, points out on the starboard side, while the starboard cable at the same time grows out on the larboard side, there is a cross in the hawse. If, after this, the ship, without returning to her former position, continues to wind about the same way, so as to perform an entire revolution, each of the cables will be twisted round the other, and then directed out from the opposite bow, forming what is called a round turn. An elbow is produced when the ship stops in the middle of that revolution, after having had a cross: or, in other words, if she rides with her head northward with a clear hawse, and afterwards turns quite round so as to direct her head northward again, she will have an elbow.

HAUSE-Holes, certain cylindrical holes cut through the bows of a ship on each side of the stem, through which the cables pass in order to be drawn into or let out of the vessel as occasion requires. They are fortified on each side by a name

HAWSE-Pieces, a name given to the foremost timbers of a ship, whose lower ends rest on the knuckle-timber, or the foremost of the cant-timbers. They are generally parallel to the stem, having their upper ends sometimes terminated by the lower part of the beak-head; and otherwise, by the top of the bow, particularly in small ships and merchantmen.

HAWSER, a large rope which holds the middle degree between the *cable* and *tow-line*, in any ship whereto it belongs, being a size smaller than the former, and as much larger than the latter.

HAY, any kind of grass cut and dried for the food of cattle.

The time of mowing grass for hay must be regulated according to its growth and ripeness; nothing being more prejudicial to the crop than mowing it too soon; because the sap is not then fully come out of the root, and when made into hay the grass shrinks away to nothing. It must not, however, be let stand

too long till it have shed its seeds. When the tops of the grass look brown, and begin to bend down, and the red honeyfuckle flowers begin to wither, you may conclude it ripe for mowing.

Sain-Foin HAY, is of several sorts, which may be distinguished by the following terms, viz. 1. The virgin. 2. The blossomed. 3. The full-grown. And, 4. The threshed hay. The first of these is beyond comparison the best. It must be cut before the blossoms generally appear; for when it stands till it is full blown, the most spirituous and nourishing parts of its juice are spent, the sap is much impoverished, and the saint-foin can never recover that richness it had in its virgin-state. But this fine hay cannot well be had of uncultivated saint-foin, because that may not be much above an handful high when it is in a condition to be cut; it would then make a very light crop, and would be a great while before it sprang up again: but the rich will have two or three tuns to an acre, and spring again immediately for a second crop; so that little or none in quantity would be lost by so great an improvement of its quality.

The second sort is that cut in the flower, which, though much inferior to the virgin-hay, far exceeds any other kind as yet commonly propagated in Britain; and if it be a full crop, it may amount to three tuns an acre. This is that saint-foin which is commonly made; and the larger it is, the more nourishing it is for horses.

The next sort of saint-foin is the full grown, cut when the blossoms are gone or going off: this also is good hay, though it falls short by many degrees of the goodness of the other two sorts; but it makes a greater crop than either of them, because it grows to its full bulk, and shrinks little in drying.

The last sort is the threshed hay; which, when not damaged by wet weather, has been found more nourishing to horses than coarse water-meadow hay; and, when it is cut small by an engine, is good for cattle, and much better than the chaff of corn. The best time to cut it, is when the greatest part of the seed is well filled; the first-blown ripe, and the last-blown beginning to be full.

The goodness of the hay depends greatly upon the manner of ordering it. The best hay in all England is made of saint-foin, without ever spreading it. This method, though it be longer before it be finished, costs less labour than the other. If saint-foin be laid up pretty green, it will take no damage, provided it be set in small round ricks, with a large basket drawn up in the middle of each, to have a vent-hole through which the superfluous moisture of the hay may transpire. As soon as its heating is over, these ricks ought to be thatched; and all saint-foin ricks, that are made when the hay is full dried in the cocks, ought to be thatched immediately after the making them. That which is laid up moist dried, will come out of the rick of a green colour; but that which has been much heated in the rick, will be brown.

The feed affords the owner another opportunity of making a profit of his saint-foin: but this, if the hoeing husbandry were general, would not be vendible in great quantities for planting; because the ordinary crop of an acre will produce seed enough to drill an hundred acres, which would not want planting for a long

Hay.

Hay
Hazard.

long time. The other use then of this feed is for provender; and it has been affirmed by some who have made trials of it, that three bushels of good fair-foin seed given to horses, will nourish them as much as four bushels of oats; and when well ordered, it is so sweet, that most sorts of cattle are greedy of it.

HAY-MAKING. See AGRICULTURE, n^o 152, *et seq.*

HAY, a town in Brecknockshire, in Wales, seated near the confluence of the rivers Wyc and Dulas. It was a town of good note in the time of the Romans; it being then fortified with a castle and a wall, which were ruined in the rebellion of Owen Glendower. It is at present a pretty good town; and the market is large for corn, cattle, and provisions. W. Long. o. 56. N. Lat. 52. 10.

HAYNAULT. See HAINAULT.

HAYS, particular nets for taking rabbits, hares, &c. common to be bought in shops that sell nets, and they may be had larger or shorter as you think fit; from 15 to 20 fathom is a good length, and for depth a fathom.

As rabbits often straggle abroad about mid-day for fresh grass, where you perceive a number gone forth to any remote brakes or thickets, pitch two or three of these hays about their burrows; lie close there: but in case you have not nets enough to enclose all their burrows, some may be stopped up with stones, &c. Then set out with the coney dog to hunt up and down at a good distance, and draw on by degrees to the man who is with you, and lies close by the hay, who may take them as they bolt into it.

HAYWARD, the person who keeps the common herd or cattle of a town. He is appointed by the lord's court; and his office is to see that the cattle neither break nor crop the hedges of inclosed grounds.

HAYWARD (Sir John), an eminent English historian and biographer, in the beginning of the 17th century, was educated in the university of Cambridge, where he took the degree of doctor of laws. In 1610, he was appointed one of the historiographers of a college then at Chelsea; and, in 1619, received the honour of knighthood. He wrote, 1. The lives of the three Norman kings of England, William I. and II. and Henry I. 2. The first part of the life and reign of king Henry IV. 3. The life and reign of king Edward VI.; and several theological works. He died in 1627.

HAZÆL, an officer belonging to Benhadad king of Syria, caused that prince to be put to death, and reigned in his stead. He defeated Joram, Jehu, and Jehoahaz, kings of Israel; and, after his death, was succeeded by Benhadad his son, 852 B. C.

HAZARD, a game on dice, without tables, is very properly so called; since it speedily makes a man, or undoes him.

It is played with only two dice; and as many may play at it as can stand round the largest round table.

Two things are chiefly to be observed, viz. main and chance; the latter belonging to the castor, and the former, or main, to the other gamesters. There can be no main thrown above nine, nor under five; so that five, six, seven, eight, and nine, are the only mains flung at hazard. Chances and nicks are from four to ten: thus four is a chance to nine, five to eight, six to seven, seven to fix, eight to five; and

nine and ten a chance to five, six, seven, and eight: in short, four, five, six, seven, eight, nine, and ten, are chances to any main, if any of these nick it not. Now nicks are either when the chance is the same with the main, as five and five, or the like; or fix and twelve, seven and eleven, eight and twelve. Here observe, that twelve is out to nine, seven, and five; eleven is out to nine, eight, six, and five: and ames-ace and duce-ace, are out to all mains whatever.

HAZLE, or HAZEL, in botany. See CORYLUS.

The kernels of the fruit have a mild, farinaceous, oily taste, agreeable to most palates. Squirrels and mice are fond of them, as well as some birds, such as jays, nutcrackers, &c. A kind of chocolate has been prepared from them, and there are infusions of their having been formed into bread. The oil expressed from them is little inferior to the oil of almonds; and is used by painters, and by chemists, for receiving and retaining odours. The charcoal made of the wood is used by painters in drawing.—Some of the Highlanders, where superstition is not totally subsided, look upon the tree itself as unlucky; but are glad to get two of the nuts naturally conjoined, which is a good omen. These they call *cho-chomblaich*, and carry them as an efficacious charm against witchcraft.

Evelyn tells us, that no plant is more proper for thickening of copses than the hazle, for which he directs the following expeditious method. Take a pole of hazle (ash or poplar may also be used) of 20 or 30 feet in length, the head a little lopped, into the ground, giving it a chop near the ground to make it succumb; this fastened to the earth with a hook or two, and covered with some fresh mould at a competent depth, (as gardeners lay their carnations), will produce a great number of suckers, and thicken and furnish a copse speedily.

HAZLE-EARTH, or Hazley-earth, a kind of red loam, which is said to be an excellent mixture with other sorts of earth; uniting what is too loose, cooling what is too hot, and gently entertaining the moisture.

HEAD, in anatomy. See ANATOMY, Part I. chap. ii.

HEAD-ACH, a most troublesome sensation in the head, produced by various causes, and attended with different symptoms, according to its different degrees and the place where it is seated. See (the *Index* subjoined to) MEDICINE.

Dragon's HEAD, in astronomy, is the ascending node of the moon or other planet.

HEAD of a Ship, an ornamental figure erected on the continuation of a ship's stem, as being expressive of her name, and emblematical of war, navigation, commerce, &c.

HEAD, is also used in a more enlarged sense to signify the whole front or forepart of the ship including the bows on each side: the head therefore opens the column of water through which the ship passes when advancing. Hence we say, head-fails, head-sea, head-way, &c.

Thus, fig. 1. Plate CLIX. represents one side of the fore-part or head of a 74 gun-ship, together with part of the bow, keel, and gunnel. The names of the several pieces, exhibited therein, are as follow:

A A Fore-part of the keel, with *aa* the two false keels

Hazle,
Head.

Head. keels beneath it.

a C The stem.

a a The cat-head.

b b The supporter of the cat-head.

c c The knight-head, or bollard-timber, of which there is one on each side, to secure the inner end of the bowprit.

d d The haufe-holes.

e e The naval-hoods, i. e. thick pieces of plank laid upon the bow to strengthen the edges of the haufe-holes.

f The davit-chock, by which the *davit* is firmly wedged while employed to fift the anchor.

g The bulk-head, which terminates the fore-castle on the fore-side, being called the *beak-head bulk-head* by shipwrights.

H The gun-ports of the lower deck.

b The gun-ports of the upper deck and fore-castle.

I, I, The channels, with their dead-eyes and chain-plates.

i The gripe, or fore-foot, which unites the keel with the stem, forming a part of either.

k k These dotted lines represent the thickness and descent of the different decks from the fore-part of the ship towards the middle. The lowest of the three dotted lines l expresses the convexity of the beams, or the difference between the height of the deck in the middle of its breadth, and at the ship's side. This is also exhibited more clearly in the *MIDSHIP-Frame*; where the red curve of the beam is delineated. N. B. These lines must be always parallel to the lines which terminate the gun-ports above and below.

m m The timbers of the head, and part of the bow-sprit.

X The rails of the head which lie across the timbers.

Q Z Fore-part of the main-wale.

R X Fore-part of the channel-wale.

U C The load water-line.

Fig. 2. represents a head-view of a ship, with the projection of her principal timbers, and all her planks laid on one side.

It is evident that the fore-part of a ship is called its *head*, from the affinity of motion and position it bears to a fish, and in general to the horizontal situation of all animals whilst swimming.

By the *HEAD*; the state of a ship, which is laden deeper at the fore-end than the after-end.

HEAD-Fast, a rope employed to fasten a ship to a wharf, chain, or buoy, or to some other vessel alongside.

HEAD-Land, a name frequently given to a cape, or promontory.

HEADMOST, the situation of any ship or ships which are the most advanced in a fleet, or line of battle.

HEAD-Rope, that part of the bolt-rope which terminates any of the principal sails on the upper edge, which is accordingly sewed thereto. See the article *BOLT-ROPE*.

HEAD-Sail, a general name for all those sails which are extended on the fore-mast and bowprit, and employed to command the fore-part of the ship: such are the fore-sail, fore-top-sail, fore-top-gallant-sail, jib, fore-stay-sail, and the sprit-sail with its top-sail.

This term is used in opposition to *after-sails*, viz. all those which are extended on the mizen-mast, and on the stays between the mizen and main masts.

HEAD To-wind; the situation of a ship or boat, when her head is turned to windward.

HEAD-Way, the motion of advancing at sea. It is generally used when a ship first begins to advance; or when it is doubtful whether the ship is in a state of rest or motion. It is in both senses opposed to retreating, or moving with the stern foremoit. See the article *STERN-WAY*.

HEALTH, is a right disposition of the body, and of all its parts; consisting in a due temperature, a right conformation, just connection, and ready and free exercise of the several vital functions.

Health admits of latitude, as not being the same in all subjects, who may yet be said to enjoy health.

That part of medicine, which shews the means of preserving health, is termed *hygiene*. See *MEDICINE*.

The Greeks and Romans deified Health, representing it under the figure of a woman, whom they supposed to be the daughter of *Æsculapius*. We find the name of the goddess *Salus*, or Health, on many medals of the Roman emperors, with different inscriptions; as, *SALUS PUBLICA*, *SALUS REPUBLICÆ*, *SALUS AUGUSTI*, &c.

Methods of preserving the HEALTH of Mariners. See *MARINER*.

HEAM, in beasts, is the same with the secundines or after-birth in women.

HEARING. See *ANATOMY*, n° 405.

HEARNE (Thomas), a celebrated antiquarian, eminent for his writings and editions of MSS. His father was parish-clerk of Little Waltham in Berkshire, where he was born in 1680. He had a liberal education by the patronage of a neighbouring gentleman; and even from a boy discovered a strong propensity to the study of antiquities. He did great services to the Bodleian library, and died in 1735.

HEARSE, among sportsmen, a hind of the second year of her age.

HEART, in anatomy. See there, n° 382 [385].

Several ingenious persons have from time to time attempted to make estimates of the force of the blood in the heart and arteries; who have as widely differed from each other, as they have from the truth, for want of a sufficient number of data to argue upon. This set the truly ingenious Dr Hales upon making proper experiments, in order to ascertain the force of the blood in the veins and arteries of several animals.

If, according to Dr Keil's estimate, the left ventricle of a man's heart throws out in each systole an ounce or 1.638 cubic inches of blood, and the area of the orifice of the aorta be = 0.4187, then dividing the former by this, the quotient 3.9 is the length of the cylinder of blood which is formed in passing through the aorta in each systole of the ventricle; and in the seventy-five pulses of a minute, a cylinder of 292.5 inches in length will pass: this is at the rate of 1462 feet in an hour. But the systole of the heart being performed in one third of this time, the velocity of the blood in that instant will be thrice as much, viz. at the rate of 4386 feet in an hour, or 73 feet in a minute. And if the ventricle throws out one ounce in a pulse, then in the seventy-five pulses of a minute, the quantity

Head
||
Heart.

Heart
||
Heat.

quantity of blood will be equal to 4.4lb 11 oz. and, in thirty-four minutes, a quantity equal to a middle-sized man, viz. 158 lb. will pass through the heart. But if, with Dr Harvey and Dr Lower, we suppose two ounces of blood, that is, 3.276 cubic inches, to be thrown out at each systole of the ventricle, then the velocity of the blood in entering the orifice of the aorta will be double the former, viz. at the rate of 146 feet in a minute, and a quantity of blood equal to the weight of a man's body will pass in half the time, viz. 17 minutes.

If we suppose, what is probable, that the blood will rise 7+ $\frac{1}{2}$ feet high in a tube fixed to the carotide artery of a man, and that the inward area of the left

ventricle of his heart is equal to fifteen square inches; these multiplied into 7+ $\frac{1}{2}$ feet, give 1350 cubic inches of blood, which presses on that ventricle, when it first begins to contract, a weight equal to 15.5 pounds.

What the doctor thus calculates, from supposition, with regard to mankind, he actually experimented upon horses, dogs, fallow-dees, &c. by fixing tubes in orifices opened in their veins and arteries; by observing the several heights, to which the blood rose in these tubes, as they lay on the ground; and by measuring the capacities of the ventricles of the heart, and orifices of the arteries. And, that the reader may the more readily compare the said estimates together, he has given a table of them, ranging in the following order.

Heart
||
Heat.

The several animals.	Weight of each.	Height of the blood in the tube from the jugular vein.	Height of the blood in the tube fixed to arteries.	Capacity of the left ventricle of the heart.	Area of the orifice of the aorta.	Velocity of the blood in the aorta.	Quantities of blood equal to the weight of the animal, in what time.	How much in a minute.	Weight of the blood contained by the left ventricle contracting.	N ^o of pulsations in a minute.	Area of transverse section of descending aorta.	Area of the transverse section of ascending aorta.
	Pounds. Ounces.	Inches.	Feet. Inches.	Cubic inches.	Square inches.	Feet and inches in a minute.	Minutes.	Pounds.	Pounds.		Square inches.	
Man	160	On breast.	7 6	1.659	0.4187	56.55	34.18	4.38	51.5	75		
Horse	18. 24. 34.		8 3 9 8 10 8	3.318		115.3	17.5	9.36				
Ox	825 1600	12	52 9	10	1.036	86.85	60	13.75	113.22	80.677	0.369	0.84
				12.5	1.539	76.95	88	18.14		58.912		
Sheep	91	5 $\frac{1}{2}$	96 5 $\frac{1}{2}$	1 85	0.172	174.5	20	4.593	36.36	65	0.094	0.07
Doe			4 2	9	0.476					0.383		0.0112
												0.246
Dogs	18. 24. 34. 18 5 41b.	0 5 5 12 8	6 6 7 2 8 5 1 3	8 1 0.53 10 5	1.172 0.195 0.185 0.118 0.101	144.77 130.9 130 120	11.9 6.48 7.8 6.7	4.34 3.7 2.3 1.85	33.61	97	0.106 0.103 0.07 0.051	0.034 0.005 0.028 0.007

HEARTBURNING, or PYROISIS. See (the *Index* subjoined to) MEDICINE.

HEARTH, that part of the pavement of a room on which the fire is immediately placed.

HEARTH-Money. See CHIMNEY-Money.

HEAT, in physiology, is used in a double sense, either as that peculiar sensation which is felt on the approach of burning bodies; or the cause of that sensation, in which last sense it is synonymous with FIRE.

The disputes which were formerly carried on with regard to the nature of heat, namely, whether we were to account it merely an effect of motion in the parts of terrestrial bodies, or of a fluid *per se*, seem now to be generally determined in favour of the latter opinion. The electric fluid and elementary fire are commonly thought to be the same, for which opinion some proofs are adduced under the article ELECTRICITY. The

discovery made by Dr Black that heat is capable of remaining in many bodies in a *latent* state, also confirms this opinion considerably*. The consequence* See *Evaporation*, *Cold*, and *Congelation*. of this discovery, however, undoubtedly is, That what we call *heat* or *fire*, depends not on the *presence* or *absence* of that fluid distinguished by the name of *elementary fire*, but on its action; just as the phenomena of electricity depend not on the presence or absence of the electric fluid, which is equally present at all times and in all places, but on its action.—Another inference, easily deducible from this principle is, That as the electric fluid is by its different manner of action capable of producing two different and seemingly opposite effects, distinguished by the names of *positive* and *negative* electricity; so doth the same fluid, acting as elementary fire, produce two different and seemingly opposite effects, called *heat* and *cold*.—This assertion will.

Heat owing to the action of a fluid.

Heat.

will not be thought paradoxical, when we consider that ocular demonstration may be given us, that a substance (namely, vapour), exceedingly cold to the touch, shall yet contain as much heat, as would be sufficient to heat the water of which it is composed, red hot, did the nature of water permit it to endure an heat of this kind.

See EVAPORATION, n^o 9.

Dr Martin's opinions concerning heat.

The philosophers of this country who have most recently treated the subject of heat scientifically are, Dr Martin of St Andrews, Dr Black of Edinburgh, and Dr Irvin of Glasgow. Dr Martin, in an essay on the various degrees of heat in bodies, endeavours to shew, that what we call *heat*, depends not entirely upon the quantity of elementary fire which is poured upon the body *ab extra*; but upon certain circumstances arising from the constitution of the body itself, and its situation with regard to others. "We all find (says he) our great heats to be in these places that lie low, and have a great height of atmosphere above them, and surrounded by eminences and rising grounds. If you ascend on high to the tops of very elevated mountains, you are chilled with cold, and you find everlasting snows, that after thousands of summers have scarce ever been thawed, though every day exposed to the direct rays of the sun, which in some places are darted perpendicularly upon them. So necessary, it seems, is a long and direct passage through all or the greatest part of the depth of our atmosphere, or the assistance of its pressure, or the reflections of rays from the earth's own surface, to invigorate those rays, and to give them strength for warming terrestrial bodies. To which too the particular sulphureous nature of the low parts of the atmosphere may not a little contribute.

"But what if the real solar heat, both in itself, and what it can communicate to us and other planetary bodies (while it is not concentrated by burning-glasses, or strengthened by other assistances), be vastly less than is commonly reckoned? All the natural heat we meet with here on the earth we are ready to ascribe to the heat of the sun, which perhaps has but a small share in it, overlooking a source of heat, which, though often spoke of by the theorists of the earth, is seldom considered in that advantageous light I would choose to take it. Every body has felt or heard, that the temperature of the air in mines or other places deep under ground is warm, or at least very tolerable; and we know from the nicest observations, that in the cave of the Observatory at Paris, only about 90 feet under ground, the heat keeps the thermometer at 53°; and that without any assistance from the sun, it being never sensibly increased by the most scorching seasons beyond its heat in the most severe winters that have been felt there.—And the same constant and unalterable degree of heat was observed by Mr Boyle, in a cave cut deep into the earth. And great and even troublesome heats are said to be observed at greater depths, and increasing in proportion to these depths; though I could wish that these heats had been more regularly measured and ascertained than what I find they have yet been. So that it would seem the body of the earth has a very great proper internal heat independent on the sun, and very much beyond what he without the intervention of our atmosphere could communicate to it; so great as, within 90 feet of its

surface, to raise the thermometer 93 divisions above Fahrenheit's cold mixture (of snow and spirit of nitre), or 453 divisions above what Mr Amontons reckoned the lowest degree of heat*. This heat of the earth at its surface is something less; and beyond that, its force decreases indeed very fast, so as to leave the air at a small height above it a good deal colder; and which we find on the very high hills to be excessively cold, and not to be much warmed by the additional heat of the sun's direct rays, if they be but little altered by the earth's surface and atmosphere.—So then the sun, though it be not the sole or chief fountain, is as it were the great regulator of motion, heat, and life, to the inhabitants of this system."

This opinion hath also been adopted by others, but will probably never come into general credit. We certainly perceive the sun to be the force and fountain of heat to the surface of the earth at least, as much as we perceive a common fire to be the source of heat to a person who stands before it. Nor is the sun's heat increased or diminished, except by those very circumstances which increase or diminish the heat of a common fire. Though a person should stand directly before the fire, yet if a strong blast of air rushes into the room at the same time, he will not find himself warm; but it would be a very erroneous conclusion to infer from thence, that the heat of the fire was less than what people commonly supposed. If he excludes the blast of air by shutting the room-door, he will find the heat greatly increased, though he comes no nearer the fire than before; and if he causes any substance capable of reflecting the light strongly to be placed at a small distance behind him, such as a large piece of tinned iron, he will then very probably feel the heat intolerable in that very place where it was disagreeably cold before. Now the circumstances which increase or diminish the heat of the sun are quite similar to those above-mentioned. On the top of an high mountain the air has free access on all sides, except the small point of earth where the person stands; the rest of the earth also is at too great a distance to have any effect in diminishing the cold by its reflective power; and as in these high regions there are commonly violent winds, the cold is thereby greatly increased. But when we descend into the plain, the air has much less access. The immense body of the earth effectually shelters us from the air on one side, at the same time that by its reflection it acts like the piece of metal above-mentioned; while its inequalities in a great measure shelter us from the winds all around; and hence the heat at the foot of a mountain may be intolerable, while the cold is equally so at the top. It will now follow, that *heat* is not properly speaking the mere presence of the rays of the sun, but their action after a certain manner, without interruption from any other substance; and that *cold* is not any privation or absence of these rays, but is occasioned by whatever prevents them from acting in the manner above-mentioned; and if there is any substance in nature which constantly tends to prevent that action, such a substance is *cold* in the abstract. A substance of this kind is our atmosphere, or some principle in it*; tho' very possibly that principle, as already hinted, may be no other than elementary fire itself acting in a different manner.

With regard to the opinions of Dr Black and Irvin

Heat.

See INTERNAL HEAT of the Earth, infra.

Objections to which they are liable.

* See COLD, n^o 4.

Heat.

vin upon this subject, it is impossible to give such a full account as could be wished; because the gentlemen have not thought proper to publish their sentiments to the world. From what we have been able to collect, however, and which is authenticated by Dr Black himself, his general opinion is, that heat is a substance *per se*: that when this substance is present in any terrestrial body, in a certain degree, that body is sensibly hot; when a lesser quantity of heat is present, the substance is cold: but there is no such thing as a positive cold; and all those degrees of cold known to us, even the most violent, are only smaller degrees of heat; and of this heat the sun is to us the only source and fountain. For his opinions concerning sensible and latent heat, see the articles CONGELATION, EVAPORATION, and FLUIDITY.

Dr Cleghorn's account of Dr Irvin's opinions.

Dr Irvin hath attempted to give a solution of the phenomena of latent heat; and though he hath not yet published this explanation himself, an account of it hath appeared in an inaugural dissertation *De igne*, published at Edinburgh, by Dr Cleghorn, in 1779. The substance of what this gentleman hath delivered, is as follows:

"Heat is occasioned by a certain fluid, and not by motion alone, as some eminent writers have imagined: because, 1. Those who have adopted the hypothesis of motion, could never even prove the existence of that motion for which they contended; and though it should be granted, the phenomena could not from it be explained. 2. If heat depended on motion, it would instantaneously pass through an elastic body; but we see that heat passes through bodies slowly like a fluid. 3. If heat depended on vibration, it ought to be communicated from a given vibration in proportion to the quantity of matter, which is found not to hold true in fact. On the other hand, there are numberless arguments in favour of the opinion that heat proceeds from elementary fire. 1. Mr Locke hath observed, that when we perceive a number of qualities always existing together, we may gather from thence, that there is really some substance which produces these qualities. 2. The hypothesis of elementary fire is simple, and agreeable to the phenomena. 3. From some experiments made by Sir Isaac Newton it appears, that bodies acquire heat and cold *in vacuo*, until they become of the same temperature with the atmosphere; so that heat exists in the absence of all other matter, and is therefore a substance by itself.

"Our senses are no just measures of the degrees of heat and cold*:—but the thermometer truly shews the increase or diminution of heat in the same body, while it preserves the same form; but this it will only do within certain limits. For when fluids are on the point of freezing, they contract irregularly, and expand in the same manner when brought near the boiling point. The thermometer, however, cannot shew the absolute quantity of heat contained in any body, because the beginning of the thermometrical scale by no means denotes the total absence of heat. For the same reason, it cannot even shew us the proportion between the quantities of heat contained in two different bodies; but Dr Black hath discovered a very ingenious and accurate method of shewing this last.

"It is universally known, that when two substances of different temperatures are mixed together, the

one loses and the other acquires heat, till they both appear of the same temperature. Let, therefore, any quantity of water be mixed with an equal bulk of any other substance, either hotter or colder than itself, and observe what happens on the mixture. If the one gains as much as the other loses, both of them contain the same quantity of heat, when in their natural state; but if the one gains more than the other loses, then their natural quantities of heat differ in the same proportion.

"If any body, heated beyond the common temperature of the air, is exposed to it, the heat flows out from it into the atmosphere, and disposes itself equally around, till the air becomes of the same temperature with itself. The same happens to bodies suspended *in vacuo*. Hence it is justly concluded, there exists between the particles of heat a repulsive power, by which they mutually recede from each other.

"Notwithstanding this repulsive power, however, the quantities of heat contained in different substances even of the same temperature, are found to be altogether different. This is sufficiently proved by some experiments made by Fahrenheit and Boerhaave, and still further confirmed by others made by the learned Dr Black. He took equal bulks of water and mercury; and having heated the mercury 50° above the other, mixed them together as quick as possible. The temperature of the mixture was 20 degrees above the original temperature of the water. Again, having made the water 50° hotter than the mercury, the temperature of the mixture was 30° above the original temperature of the mercury. Hence it appears that the quantity of heat in water is to that in mercury when both are of an equal temperature, as 3 to 2. By similar experiments he hath also determined the quantities of heat contained in a great many different bodies; so that now it appears that the quantity of heat is scarce ever the same in any two different bodies; and hence we may conclude, that terrestrial bodies have a power of attracting heat, and that this power is different in different substances.

"From these principles it evidently follows, that heat is distributed among bodies directly in proportion to their attracting powers, and inversely according to the repulsive power between the particles of heat themselves.—Such is the distribution of heat among bodies in the neighbourhood of each other; and which is called the equilibrium of heat, because the thermometer shews no difference of temperature among them. For, seeing the heat is distributed according to the attracting power of each, the thermometer having also a proper attractive power of its own, can shew no difference in the quantity of heat contained in each; for which reason, all bodies in the neighbourhood of each other are soon reduced to the same temperature. Hence we can neither assent to the opinion of Boerhaave, who supposed that heat was distributed among bodies in proportion to their bulks; nor to the hypotheses of others, who imagined that they were heated in proportion to their densities. For the thermometer shews only the quantity of heat *going out* of a body, not that which is really contained in it; and both the above-mentioned hypotheses are overturned by the experiments already recited.

"This equilibrium of heat may be broken while the quantity of heat in the different bodies remains

Heat.

* See Cold, no 1.

the flame. For seeing the heat is distributed through all bodies directly in proportion to their attraction of it, and inversely in proportion to the repulsion of the igneous particles; if in any body the former is diminished, or the latter augmented, the fire will flow out of the body until the equilibrium is again restored, and then the heat is said to be *generated*. On the contrary, if the attraction of any body towards heat is augmented, or the repulsion between its particles diminished, then heat will flow into the body, and cold is said to be generated.—This is explained by an experiment of Dr Cullen's. A thermometer suspended in the receiver of an air-pump, descended some degrees while the air was exhausting, but quickly recovered the temperature of the external atmosphere; and when the air was again admitted, it ascended beyond the temperature of the external air. While the air was exhausting, the thermometer descended, because the air which remained being rarified, the repulsion between the particles of fire contained in it was diminished, and therefore the heat flowed out from the thermometer; but being allowed to remain for a short time *in vacuo*, it acquired the temperature of the external air, and the equilibrium was restored. When the external air was admitted, then that which had remained in the receiver, and acquired the temperature of the external air, being suddenly compressed, the repulsion between the igneous particles was increased, and the heat entering into the thermometer caused it rise. From other experiments also it appears, that the temperature of the air becomes hotter by condensation, and colder by rarefaction; the reason of which is manifest from the principles already laid down.

“Fluidity and evaporation are justly reckoned general effects of heat; for there is scarce any body which cannot be liquefied, and even carried off into vapour by an intense heat. The fluidity of water is universally known to depend on heat. Mercury likewise, by an intense cold, may be deprived of its fluidity*. Air is a kind of vapour which always becomes denser by a diminution of its heat; and it is not improbable, that by a very great diminution of its heat the air itself might become solid; and this conclusion is confirmed by the analogy of other vapours.

“These phenomena may be explained from the principles already laid down. For the particles of all solids are connected by the attraction of cohesion; of which, as well as of every other attraction, the nature is such, that if any new attraction is induced, the former is weakened. As much heat, therefore, may be added to a body as may increase its power of attracting heat to such a degree, that the attraction of cohesion will be totally dissolved, and the particles will easily slide over one another, in which case the body becomes fluid. If the fire is still kept up, that fluid becomes rarer, the heat communicates the repulsion between its own particles to those of the fluid, which is now raised in vapour. Again, this vapour by a diminution of the heat is converted into a fluid, and by a still farther diminution remains perpetually contracted into the form of a solid.

“If indeed such is the power of bodies to attract heat, and such the nature of heat as has been already laid down, we might conclude *a priori*, that the force by which any substance attracts heat would be increa-

sed while it was melting, or going off in vapour; that is, that liquefaction or evaporation would produce cold: and on the other hand, that when vapour was reduced into a liquid, or any fluid congealed into a solid, its power of attracting heat would be diminished; and therefore heat, according to the common phrase, would be *generated*. For when, by the solution of the body, the attraction of cohesion is taken away, the attraction of the body for heat is increased. And when evaporation takes place, the body, and therefore the heat which is in it, becomes more rare; the consequence of which is, that the repulsive power between the particles of fire is diminished, the equilibrium is taken off, and the heat enters the vapour on all sides.

“The learned philosopher Dr Black was the first who demonstrated experimentally that heat entered bodies in great quantity while they liquefy or are converted into vapour; and that the same quantity flowed out of them again while they were condensing into fluids, or congealing into solids; and from this principle he hath explained a great number of phenomena, in which heat or cold were formerly said to be *generated*. The heat, as long as it is inherent in these bodies, he calls *latent*; because, while it enters the body, it does not change its sensible temperature; nor, after it has entered, does it affect the thermometer; and he was of opinion, that upon a certain quantity of latent heat the states of fluidity and vapour principally depended.

“But an ingenious physician (Dr Irvin, professor of chemistry at Glasgow,) having made many experiments in order to find out the quantity of heat contained in different bodies, according to Dr Black's method, hath observed, that the same body, under different forms, shews different dispositions with respect to heat; that ice, for instance, mixed with mercury 20 degrees colder than itself, lessened the cold of the mixture in a smaller degree, or imparted to it a smaller quantity of heat than water mixed with mercury 20 degrees colder than itself. Hence that learned gentleman hath concluded, that the great quantity of heat which is found to enter into bodies while they evaporate, or are reduced to a fluid state, is absorbed by them because of their change of form, and consequently of their disposition towards heat; and hence that the entrance of the heat is not to be accounted the *cause*, but the *effect* or *consequence*, of fluidity or vapour. This opinion indeed seems more probable, and agreeable to the principles already laid down, than the other. But we must carefully remember, that the thermometer can only measure that quantity of heat which flows out from bodies, not that which enters into them. If, therefore, a quantity of heat in vapour affects the thermometer less than an equal quantity in water, we are thence to conclude, that vapour has a stronger attraction for heat than water, and therefore the thermometer attracts a smaller quantity of heat from it than from water. When melting ice absorbs a great quantity of heat, which yet does not affect the thermometer; and when water converted into ice, throws out a great quantity of heat upon the thermometer or other bodies around it; these phenomena are easily explained from the greater attraction which water has for heat.

“The increase of the attraction which water has
for

* See
Congelation,
no 2. and
Cold, no 8.

Heat.

Heat.

for heat, arises from the solution of its attraction of cohesion, as appears probable from analogy. But heat rushes into vapour, because it is distributed among bodies directly in proportion to their attractive powers, and inversely in proportion to the repulsive power between its own particles. When water is converted into vapour, its parts are removed to a distance from each other, and consequently the particles of heat. The repulsion between the latter, therefore, is diminished; the heat flows into the vapour, until the repulsion between its particles with respect to the attracting power of the body becomes the same as before; whence we plainly see the reason why vapour absorbs the greater quantity of heat in proportion as it is more expanded.

"That heat accompanies the rays of the sun, is beyond all doubt; but whether the sun communicates heat to the rays of light, or whether they attract it from the air, is with me a matter of uncertainty. If heat is derived from the sun, how comes it to pass that the earth is no hotter after having received such an immense quantity of heat for so many ages? If the heat is communicated from the earth to the air, and is not again carried off from thence, why is the atmosphere so cold in its upper parts; or why has not the equilibrium of heat yet pervaded the whole atmosphere? If the rays of light have received heat from the sun himself, why does not an equal quantity of heat accompany the same quantity of light at all different distances from the earth?—These, and other objections, shew, that heat does not flow from the sun; and some of them plainly shew, that heat is attracted from the atmosphere; which thought we shall now prosecute a little farther.

"Heat is of such a nature, as I have already shewn, that, when accumulated, it diffuses itself all around, and joins with bodies in proportion to their attractive powers; but if the rays of light are collected into a focus in the air, and no more heat is added to the air, the quantity of heat in the collected rays is not increased in proportion to their own attraction, more than of the air in proportion to its attraction. But if they are *in equilibrio* as to their heat, before the collection by the focus, this shews, that heat has entered the rays of light from the atmosphere, seeing their temperature increases by condensation. But that the rays of the sun really do attract heat from the atmosphere, seems to be proved by the observations of De Luc; who hath observed, that the heat is very much, and very suddenly, decreased before sun-rising; which shews, that the rays of the sun, sweeping along at a small distance above the earth, abstracted the heat from that part of the atmosphere, which therefore flowed from the lower parts to supply the place of that which was taken away."

From this last paragraph it seems natural to conclude, that the sun, instead of being the source of heat, is really a source of cold; and the atmosphere the only reservoir of heat to us. But, on this supposition, it seems difficult to conceive how the heat of the atmosphere could remain the same in quantity, even for a single moment. The rays of the sun, it is said, cool the atmosphere, and carry off its heat; while they sweep along it at a little distance from the surface of the earth. But this they are perpetually doing. While the sun, for instance, is shining directly

upon Britain, his rays are cooling the atmosphere above America. But these rays which thus pass through the atmosphere without touching the earth's surface, fly into the most remote regions of space, and consequently must carry the heat of our atmosphere along with them, where it must be for ever lost to us. Thus the general quantity of heat would be perpetually diminishing; and in such a number of ages as have intervened from the beginning of the world, it must have been totally diffipated, or diffused through spaces to which our earth and its atmosphere bear not the proportion of 1 to 10,000,000,000.

His explanation of Dr Black's principle of latent heat is, perhaps, equally liable to objection. We shall for a moment allow, that the absorption of heat is the *consequence*, and not the *cause*, of fluidity and vapour: but what then is the *cause*? It seems undeniable, that the cause is a quantity of heat, greater than what the body is naturally fitted to contain, forced upon it *ab extra*: but this heat, the moment it enters the body, is to appearance lost and annihilated, while the body changes its form. How is it possible, then, to assign another cause for the change of form in the body, than its absorption of the quantity of heat which was forced upon it *ab extra*?—To say that the body now attracts heat from the atmosphere in greater quantity than it did before, and which enters it copiously, cannot be admitted. The body did not originally *attract* the heat; it was plainly forced upon it; a quantity of heat entered it, and changed its form. This quantity therefore remains within the body, and neither attracts nor repels that which is in the atmosphere. The body can attract no more, unless that which has already entered was to be thrown out; and therefore the coldness of vapour cannot be owing to its attraction of heat from the atmosphere: neither is it owing to its attracting heat more than water does; for vapour may be heated in such a manner, that it will part with heat as readily as water, or any other substance whatever.—Nor does the experiment adduced in favour of this doctrine seem conclusive. Ice communicates less heat to mercury 20 degrees colder than itself, than water does; but for this two reasons may be assigned. 1. When bodies are intensely heated, they part with their heat very readily, and in great quantity; but as the heat decreases, it also flies off, or is communicated to surrounding bodies more slowly and with more difficulty than before. Water always contains a greater quantity of heat than ice, and therefore ought to part with an equal quantity of heat more readily and easily than ice does. 2. When water is cooled to 32 degrees, it freezes; when just above 32 degrees, it becomes fluid; and, with every degree of heat superior to that, evaporates. If water heated to 212 degrees, or near it, is placed within the receiver of an air-pump, and the air exhausted, a great quantity of steam issues from it, and the heat of the water suddenly decreases to 98 or 100 degrees. Hence it is plain, that 112 degrees of the heat of boiling water is contained, not in the water itself, but in the steam detained among its particles by the pressure of the atmosphere. Had this water, therefore, been mixed with mercury much colder than itself, a quantity of the steam would have been condensed by the coldness of the metal. But steam cannot be condensed

without giving out, not only its sensible heat, but that which is *latent* also; and hence we may easily see why water communicates degrees of heat so much greater in proportion than ice does.

Lastly, The principle on which the whole doctrine is founded, does not seem to agree either with the phenomena of nature, or with the conclusions which must be drawn from itself. It is said, that fire tends to diffuse itself equally on all bodies in the neighbourhood of one another. But does this hold in fact? Heat has a disposition to ascend; and that not only in the atmosphere, but *in vacuo*, and through solid bodies. If a bar of iron, red-hot at one end, is set to cool with its red part undermost, the heat will ascend farther and quicker through it, than it will descend if the iron is placed the contrary way. The argument, therefore, for the repulsive power between the particles of heat does not hold, nor that for the attraction between the particles of heat and those of other matter. Though different bodies contain different quantities of heat, this difference may be occasioned otherwise than by attraction. We have already seen, that a certain quantity of heat absorbed by water in the state of ice, is the cause of its fluidity. The same is the case with mercury; but the latter can remain fluid with much less heat than water can. It must, however, be admitted, that the substances we call *water* and *mercury* are only so in consequence of the action of heat. Thus, water deprived of a certain quantity of heat, is no longer *water*, but a kind of glass; and mercury is no longer *mercury*, but a solid metal. Now, let us suppose, that ice at 32 degrees is applied to a quantity of mercury at 32; we know that the ice is only water deprived of a quantity of its natural heat, and of consequence it ought to have a violent attraction for that quantity which has been forced from it. The mercury has a great deal of heat to spare, yet the ice attracts none from it; neither will the fluid water attract heat from mercury of the same temperature, though the one is said to attract it more strongly than the other. That water should be heated by mercury hotter than itself, is not wonderful; nor can we account this an effect of attraction, because the superfluous quantity of heat would not remain in the mercury, though the water was not applied to it.

9
Explana-
tion of the
phenomena
of heat on
other prin-
ciples.

From these, and a multitude of other considerations, we would conclude, that heat itself, and not the attractive and repulsive power supposed by Dr Cleghorn and others, is the active principle which has so great a share in the operations of nature. The principles on which the actions of heat depend, may perhaps be explained in a less exceptionable manner, from the following propositions.

1. It is in all cases observed, That when light proceeds in considerable quantity from a point, diverging as the radii of a circle from its centre, there a considerable degree of heat is found to exist, if an opaque body, having no great reflective power, is brought near that point.

2. This action of the light, therefore, may be accounted the ultimate cause of heat, without having recourse to any farther suppositions; because nothing else besides this action is evident to our senses.

3. If the point from which the rays are emitted is placed in a transparent medium, such as air or water,

that medium, without the presence of an opaque body, will not be heated.

4. Another cause of heat, therefore, is the resistance of the parts of that body on which which the light falls, to the action mentioned in Prop. 1. Where this resistance is weak, as in the cases just mentioned, the heat is either nothing, or very little.

5. If a body capable of reflecting light very copiously is brought near the lucid point, it will not be heated *.

* See
the article
BURN-
ING-Glass.

6. A penetration of the light, therefore, into the substance of the body, and likewise a considerable degree of resistance on the part of that body to the action of the light, are the requisites to produce heat.

7. Those bodies ought to conceive the greatest degrees of heat, into whose substance the light can best penetrate, *i. e.* which have the least reflective power, and which most strongly resist its action; which is evidently the case with black and solid substances.

8. By heat all bodies are expanded in their dimensions every way, and that in proportion to their bulk and the quantity of heat communicated to them.

9. This expansion takes place not only by an addition of *sensible* heat, but likewise of that which is *latent*. Of this last we have a remarkable instance in the case of snow mixed with spirit of nitre. The spirit of nitre contains a certain quantity of latent heat, which cannot be separated from it without effecting a change on the spirit itself; so that, if deprived of this heat, it would no longer be spirit of nitre.— Besides this, it contains a quantity of sensible heat, of a great part of which it may be deprived, and yet retain its characteristic properties as nitrous acid. When it is poured upon snow, the latter is immediately melted by the action of the latent heat in the acid. The snow cannot be melted or converted into water, without imbibing a quantity of latent heat, which it receives immediately from the acid which melts it. But the acid cannot part with this heat without decomposition; to prevent which, its sensible heat occupies the place of that which has entered the snow and liquefied it. The mixture then becomes exceedingly cold, and the heat forces into it from all the bodies in the neighbourhood; so that, by the time it has recovered that quantity of sensible heat which was lost, or arrived at the temperature of the atmosphere around it, it will contain a considerably larger quantity of heat than it originally did, and is therefore observed to be expanded in bulk. Another instance of this expansive power of latent heat is in the case of steam, which always occupies a much larger space than the substance from which it was produced; and this whether its temperature is greater or less than the surrounding atmosphere.

10. The difference between latent and sensible heat, then, as far as we can perceive, is, that the expansive power of the first is directed only against the particles of which the body is composed; but that of the second is directed also against other bodies. Neither doth there seem to be any difference at all between them farther than in quantity. If water, for instance, hath but a small quantity of heat, its parts are brought near each other, it contracts in bulk, and feels cold. Still, however, some part of the heat is detained among the aqueous particles, which prevents the fluid from

from congealing into a solid mass. But, by a continuation of the contracting power of the cold, the particles of water are at last brought so near each other that the internal or *latent* heat is forced out. By this discharge a quantity of air is also produced, the water is congealed, and the ice occupies a greater space than the water did; but then it is full of air-bubbles, which are evidently the cause of its expansion. The heat then becomes *sensible*, or, as it were, lies on the outside of the matter; and consequently is easily dissipated into the air, or communicated to other bodies. Another way in which the latent heat may be extricated is by a constant addition of sensible heat. In this case the body is first raised into vapour, which for some time carries off the redundant quantity of heat. But as the quantity of this heat is continually increased, the texture of the vapour itself is at last totally destroyed. It becomes too much expanded to contain the heat, which is therefore violently thrown out on all sides into the atmosphere, and the body is said to burn, or be on fire. See *FLAME* and *IGNITION*.

11. Hence it follows, that those bodies which have the least share of latent heat, appear to have the greatest quantity of sensible heat; but this is only in appearance, for the great quantity they seem to contain is owing really to their inability to contain it. Thus, if we can suppose a substance capable of transmitting heat through it as fast as it received it; if such a substance was set over a fire, it would be as hot as the fire itself, and yet the moment it was taken off, it would be perfectly cool, on account of its incapacity to detain the heat among the particles of which it was composed.

12. The heat, therefore, in all bodies, consists in a certain violent action of the elementary fire within them tending from a centre to a circumference, and thus making an effort to separate the particles of the body from each other, and thereby to change its form or mode of existence. When this change is effected, bodies are said to be dissipated in vapour, calcined, vitrified, or burnt, according to their different natures.

13. Inflammable bodies are such as are easily raised in vapours; that is, the fire easily penetrates their parts, and combines with them in such quantity, that, becoming exceedingly light, they are carried up by the atmosphere. Every succeeding addition of heat to the body increases also the quantity of latent heat in the vapour, till at last, being unable to resist its action, the heat breaks out all at once, the vapour is converted into flame, and is totally decomposed. See the article *FLAME*, and Prop. 10.

14. Uninflammable bodies are those which have their parts more firmly connected, or otherwise disposed in such a manner, that the particles of heat cannot easily combine with them or raise them into vapour.

15. Heat therefore being only a certain mode of the action of elementary fire, it follows, that the capacity of a body for containing it, is only a certain constitution of the body itself, or a disposition of its parts which can allow the elementary fire contained in it to exert its expansive power upon them without being dissipated on other bodies. Those substances which allow the expansive power of the fire to operate on their own particles are said to contain a great deal of

heat; but those which throw it away from themselves upon other bodies, though they feel very hot, yet philosophically speaking they contain very little.

16. What is called the *quantity* of heat contained in any substance, if we would speak with the strictest propriety, is only the apparent force of its action either upon the parts of the body itself, or upon other bodies in its neighbourhood. The expansive force of the elementary fire contained in any body upon the parts of that body is the *quantity* of *latent* heat contained in it; and the expansive force of the fire exerted upon other bodies which touch or come near it, is the *quantity* of *sensible* heat it contains.

17. If what we call heat consists only in a certain action of that fluid called *elementary fire*, namely, its expansion, or acting from a centre to a circumference, it follows, that if the same fluid act in a manner directly opposite to the former, or press upon the particles of a body as from a circumference to a centre, it will then produce effects directly opposite to those of heat, i. e. it will then be absolute *cold*, and produce all the effects already attributed to *COLD*. See that article.

18. If heat and cold then are only two different modifications of the same fluid, it follows, that if a hot body and a cold one are suddenly brought near each other, the heat of the one ought to drive before it a part of the cold contained in the other, i. e. the two portions of elementary fire acting in two opposite ways, ought in some measure to operate upon one another as any two different bodies would when driven against each other. When a hot and a cold body therefore are brought near each other, that part of the cold body farthest from the hot one ought to become colder than before, and that part of the hot body farthest from the cold one ought to become hotter than before.

19. For the same reason, the greatest degree of cold in any body ought to be no obstacle, or at least very little, to its conceiving heat, when put in a proper situation. Cold air, cold fuel, &c. ought to become as intensely heated, and very nearly as soon, as that which is hotter.

The two last propositions are of great importance. When the first of them is thoroughly established, it will confirm beyond a doubt, that cold is a *positive* as well as heat; and that each of them has a separate and distinct power, of which the action of its antagonist is the only proper limit; i. e. that heat can only limit the power of cold, and *vice versa*. A strong confirmation of this proposition is the experiment related by M. Geoffroy; an account of which is given under the article *COLD*, n° 5. Another, but not so well authenticated, is related under the article *CONGELATION*, n° 11.—Dr. Lavoisier's observation also, mentioned by Dr. Cleghorn affords a pretty strong proof of it; for if the lower parts of the atmosphere are cooled by the passage of the sun's rays at some distance above, and it hath been already shewn that they do not *attract* the heat from the lower parts, it follows, that they must *expel* part of the cold from the upper regions.—The other proposition, when fully established, will prove, that heat and cold are really convertible into one another; which indeed seems not improbable, as we see that fires will burn with the greatest fierceness during the time of intense frosts, when the coldest air is admitted

Heat.

mitted to them; and even in those dismal regions of Siberia, when the intense cold of the atmosphere is sufficient to congeal quicksilver, it cannot be doubted that fires will burn as well as in this country; which could not happen if heat was a fluid *per se*, and capable of being carried off, or absolutely diminished in quantity, either in any part of the atmosphere itself, or in such terrestrial bodies as are used for fuel.

This theory of heat, if found admissible by philosophers, would introduce a greater simplicity into natural philosophy, and explain the phenomena of nature in a manner much more easy and less liable to objection, than hath yet been done: we would then see the phenomena of attraction, repulsion, electricity, fire, light, ignition, &c. &c. to be only as many different effects of one ethereal fluid, which the Deity hath appointed to be the first of all secondary causes, and to alter, modify, compound, and separate, the different parts of terrestrial substances, as we daily see done by the different natural agents.

HEAT of Burning Bodies. See IGNITION.

HEAT of Chemical Mixtures. This is a phenomenon necessarily resulting from the change of form produced in the different substances which are mixed together; and the manner in which it happens may be easily understood from the example of oil of vitriol and water. If equal quantities of concentrated vitriolic acid and water are mixed together, a very great degree of heat immediately takes place; inasmuch, that if the vessel which contains the mixture is made of glass, it will probably break; and after it is cold, the mixture will be found to have shrunk in its dimensions, or will occupy less space than the bulk of the water and acid taken separately. In this case we know that the water, while in its fluid state, hath as much latent heat as it can contain; *i. e.* the elementary fire within it expands, or separates its parts from each other, as much as is consistent with the constitution of the body. If any more is added, it cannot be absorbed, or direct its force upon the particles of the water without raising them in vapour: of consequence, part of this additional expansive power will be employed in the formation of vapour, and the rest will be discharged upon the neighbouring bodies; *i. e.* will be converted into *sensible* heat. The vitriolic acid, in its concentrated state, contains a great quantity of latent heat which is necessary to preserve its fluidity. But when it is mixed with the fluid water, the latent heat contained in the latter is abundantly sufficient for both: of consequence, the great expansive power in the oil of vitriol itself becomes now totally useless, and therefore exerts its force upon the neighbouring bodies; and when the mixture returns to the original temperature of the oil of vitriol and water, it shews a loss of substance by its diminution in bulk. This may serve to explain all cases in chemistry where heat or cold is produced: and it will generally be found, that where bodies, by being mixed together, produce heat, they shrink in their dimensions; but when they produce cold, they are enlarged.

HEAT of Climates. See HEAT, n° 2; and AMERICA, n° 3...24.

Methods of Measuring HEAT. See THERMOMETER.

Expansion of Metals by HEAT. See PYROMETER.

Degrees of HEAT which Animals are capable of bear-

ing. The ancients were of opinion that all countries lying within the tropics were uninhabitable by reason of their heat; but time has discovered their mistake, and it is now found that no part of the world is too hot for mankind to live in. The learned professor Boerhaave, in his chemistry, relates certain experiments made with great accuracy by the celebrated Fahrenheit, and others, at his desire, on this subject, in a sugar-baker's office; where the heat, at the time of making the experiments, was up to 146 degrees of Fahrenheit's thermometer. A sparrow, subjected to air thus heated, died, after breathing very laboriously, in less than seven minutes. A cat resisted this great heat somewhat above a quarter of an hour; and a dog about 28 minutes, discharging, before his death, a considerable quantity of a ruddy-coloured foam, and exhaled a stench so peculiarly offensive, as to throw one of the assistants into a fainting fit. This dissolution of the humours, or great change from a natural state, the professor attributes not to the heat of the stove alone, which would not have produced any such effect on the flesh of a dead animal; but likewise to the vital motion, by which a still greater degree of heat, he supposes, was produced in the fluids circulating through the lungs, in consequence of which the oils, salts, and spirits of the animal became so highly exalted.

Messieurs Du-Hamel and Tillet having been sent into the province of Augemois, in the years 1760 and 1761, with a view of endeavouring to destroy an insect which consumed the grain of that province, effected the same in the manner related in the Memoirs for 1761, by exposing the affected corn, with the insects included in it, in an oven, where the heat was sufficient to kill them without injuring the grain. This operation was performed at Rochefoucault, in a large public oven, where, for economical views, their first step was to assure themselves of the heat remaining in it, on the day after bread had been baked in it. This they did, by conveying in a thermometer on the end of a shovel, which, on its being withdrawn, indicated a degree of heat considerably above that of boiling water; but M. Tillet, convinced that the thermometer had fallen several degrees in drawing to the mouth of the oven, and appearing under some embarrassment on that head, a girl, one of the attendants on the oven, offered to enter, and mark with a pencil the height at which the thermometer stood within the oven. The girl smiled on M. Tillet's appearing to hesitate at this strange proposition; and entering the oven, with a pencil given her for that purpose, marked the thermometer, after staying two or three minutes, standing at 100 degrees of Reaumur's scale, or, to make use of a scale better known in this country, at near 260 degrees of Fahrenheit's. M. Tillet began to express an anxiety for the welfare of his female assistant, and to press her return. This female salamander, however, assuring him that she felt no inconvenience from her situation, remained there 10 minutes longer; that is, near the time when Boerhaave's cat parted with her nine lives, under a much less degree of heat; when the thermometer standing at 288 degrees, or 76 degrees above that of boiling water, she came out of the oven, her complexion indeed considerably heightened, but her respiration by no

Heat.

Heat.

means quick or laborious. After M. Tillet's return to Paris, these experiments were repeated by Monsr. Marantin, *commisnaire de guerre*, at Rochefoucault, an intelligent and accurate observer, on a second girl belonging to the oven; who remained in it, without much inconvenience, under the same degree of heat, as long as her predecessor; and even breathed in air heated to about 325 degrees, for the space of five minutes.

M. Tillet endeavoured to clear up the very apparent contrariety between these experiments and those made under the direction of Boerhaave, by subjecting various animals, under different circumstances, to great degrees of heat. From his experiments, in some of which the animals were swaddled with clothes, and were thereby enabled to resist for a much longer time the effects of the extraordinary heat, he infers, that the heat of the air received into the lungs was not, as was supposed by Boerhaave, the only or principal cause of the anxiety, laborious breathing, and death, of the animals on whom his experiments were made; but that the hot air, which had free and immediate access to every part of the surface of their bodies, penetrated the substance on all sides, and brought on a fever, from whence proceeded all the symptoms: on the contrary, the girls at Rochefoucault, having their bodies in great measure protected from this action by their clothes, were enabled to breathe the air, thus violently heated, for a long time without great inconvenience. In fact, we should think too, that the bulk of their bodies, though not thought of much consequence by M. Tillet, appears to have contributed not a little to their security. In common respiration, the blood, in its passage through the lungs, is cooled by being brought into contact with the external inspired air: In the present experiments, on the contrary, the vessels and vessels of the lungs receiving at each inspiration an air heated to 300 degrees, must have been continually cooled and refreshed, as well as the subcutaneous vessels, by the successive arrival of the whole mass of blood contained in the interior parts of the body, whose heat might be supposed at the beginning of the experiment not to exceed 100 degrees. Not to mention, that M. Tillet's two girls may not possibly have been subjected to so great a degree of heat as that indicated by the thermometer; which appears to us to have always remained on the shovel, in contact with the earth.

These experiments soon excited other philosophers to make similar ones, of which some very remarkable ones are those of Dr Dobson at Liverpool, who gives the following account of them in the *Philosophical Transactions*, vol. lxx.

"I. The sweating-room of our public hospital at Liverpool, which is nearly a cube of nine feet, lighted from the top, was heated till the quicksilver stood at 224° on Fahrenheit's scale, nor would the tube of the thermometer indeed admit the heat to be raised higher. The thermometer was suspended by a string fixed to the wooden frame of the sky-light, and hung down about the centre of the room. Myself and several o-

thers were at that time inclosed in the stove, without experiencing any oppressive or painful sensation of heat proportioned to the degree pointed out by the thermometer. Every metallic about us soon became very hot.

"II. My friend Mr Park, an ingenious furgeon of this place, went into the stove heated to 202°. After ten minutes, I found the pulse quickened to 120. And to determine the increase of the animal-heat, another thermometer was handed to him, in which the quicksilver already stood at 98°; but it rose only to 99½, whether the bulb of the thermometer was inclosed in the palms of the hands, or received in the mouth (A). The natural state of this gentleman's pulse is about 65.

"III. Another gentleman went through the same experiment in the same circumstances, and with the same effects.

"IV. One of the porters to the hospital, a healthy young man, and the pulse 75, was inclosed in the stove when the quicksilver stood at 210°; and he remained there, with little inconvenience, for 20 minutes. The pulse, now 164, and the animal-heat, determined by another thermometer as in the former experiments, was 101½.

"V. A young gentleman of a delicate and irritable habit, whose natural pulse is about 80, remained in the stove ten minutes when heated to 224°. The pulse rose to 145, and the animal-heat to 102°. This gentleman, who had been frequently in the stove during the course of the day, found himself feeble, and disposed to break out into sweats for 24 hours after the experiment.

"VI. Two small tin vessels, containing each the white of an egg, were put into the stove heated to 224°. One of them was placed on a wooden seat near the wall, and the other suspended by a string about the middle of the stove. After ten minutes, they began to coagulate; but the conglutination was sensibly quicker and firmer in that which was suspended, than in that which was placed on the wooden seat. The progress of the coagulation was as follows: it was first formed on the sides, and gradually extended itself; the whole of the bottom was next coagulated; and last of all, the middle part of the top.

"VII. Part of the shell of an egg was peeled away, leaving only the film which surrounds the white; and part of the white being drawn out, the film sunk so as to form a little cup. This cup was filled with some of the *albumen ovi*, which was consequently detached as much as possible from every thing but the contact of the air and of the film which formed the cup. The lower part of the egg stood upon some light tow in a common gallipot, and was placed on the wooden seat in the stove. The quicksilver in the thermometer still continued at 224°. After remaining in the stove for an hour, the lower part of the egg which was covered with the shell, was firmly coagulated; but that which was in the little cup, was fluid and transparent. At the end of another hour it was still fluid, except on the edges where it was thinnest; and here it was still transparent; a sufficient proof that

Heat.

(A) The scale of the thermometer, which was suspended by the string about the middle of the room, was of metal; this was the only one I could then procure, on which the degrees ran so high as to give any scope to the experiment. The scale of the other thermometer, which was employed for ascertaining the variations in the animal-heat, was of ivory.

it was dried, not coagulated.

"VIII. A piece of bees-wax, placed in the same situation with the *albumen ovi* of the preceding experiment, and exposed to the same degree of heat in the stove, began to melt in five minutes: another piece suspended by a string, and a third piece put into the tin vessel and suspended, began likewise to liquefy in five minutes."

Even these experiments, though more accurate than the former, do not shew the utmost degrees of heat which the human body is capable of enduring. Some others, still more remarkable, (as in them the body was exposed to the heat without clothes), by Drs Fordyce and Blagden, are also recorded in the Philosophical Transactions. They were made in rooms heated by stoves in the floor, and by pouring upon it boiling water. There was no chimney in them, nor any vent for the air, excepting through crevices at the door. In the first room were placed three thermometers, one in the hottest part of it, another in the coolest part, and a third on the table, to be used occasionally in the course of the experiment. Of these experiments, the two following may be taken as a specimen.

"About three hours after breakfast, Dr Fordyce having taken off all his clothes, tied his shirt, and being furnished with wooden shoes tied on with lilt, went into one of the rooms, where he staid five minutes in a heat of 90°, and begun to sweat gently. He then entered another room, and stood in a part of it heated to 110°. In about half a minute his shirt became so wet, that he was obliged to throw it aside, and then the water poured down in streams over his whole body. Having remained in this heat for ten minutes, he removed to a part of the room heated 120°; and after staying there 20 minutes, found that the thermometer placed under his tongue, and held in his hand, stood just at 100°, and that his urine was of the same temperature. His pulse had gradually risen to 145 pulsations in a minute. The external circulation was greatly increased, the veins had become very large, and an universal redness had diffused itself all over the body, attended with a strong feeling of heat; his respiration, however, was little affected. He concluded this experiment by plunging in water heated to 100°; and after being wiped dry, was carried home in a chair; but the circulation did not subside for two hours.

"Dr Blagden took off his coat, waistcoat, and shirt, and went into one of the rooms, as soon as the thermometer had indicated a degree of heat above that of boiling water. The first impression of this hot air upon his body was exceedingly disagreeable, but in a few minutes all his uneasiness was removed by the breaking out of a sweat. At the end of 12 minutes he left the room very much fatigued, but no otherwise disordered. His pulse beat 136 in a minute, and the thermometer had risen to 220 degrees."

In others of these experiments it was found, that a heat even of 260° of Fahrenheit's thermometer could be submitted to with tolerable ease. But it must be observed, that in these great heats every piece of metal they carried about with them become intolerably hot. Small quantities of water placed in metalline vessels quickly boiled; but in a common earthen ves-

sel it required an hour and an half to arrive at a temperature of 140°, nor could it ever be brought near the boiling point. Neither durst the people, who with impunity breathed the air of this very hot room at 264 degrees, bear to put their fingers into the boiling water which indicated only a heat of 212°. So far from this, they could not bear the touch of quicksilver heated only to 120°, and could but just bear spirit of wine at 130°.

Animal-Heat. Of this there are various degrees; some animals preserving a heat of 100° or more in all the different temperatures of the atmosphere; others keep only a few degrees warmer than the medium which surrounds them; and in some of the more imperfect animals, the heat is scarcely one degree above the air or water in which they live.

The phenomenon of animal-heat hath, from the earliest ages, been the subject of philosophical discussion; and, like most other subjects of this nature, its cause is not yet ascertained. The best treatises that have appeared on the subject are those of Dr Dugud Leslie, published in 1778; and Mr Adair Crawford, in 1779. From the first of these performances, the following account of the different opinions on this subject is extracted.

"The ancients possessed not the requisites for minutely investigating the science of nature; and, prone to superstition, attributed every phenomenon which excluded their investigation, to the influence of a supernatural power. Hippocrates, the father and founder of medicine, accounted animal-heat a mystery, and bestowed on it many attributes of the deity. In treating of that subject, he says in express terms, "what we call heat, appears to me to be something immortal, which understands, sees, hears, and knows every thing present and to come."—Aristotle seems to have considered the subject particularly, but nothing is to be met with in his works that can be said to throw light upon it.—Galen tells us that the dispute between the philosophers and physicians of his time was, "whether animal-heat depended on the motion of the heart and arteries; or whether, as the motion of the heart and arteries was innate, the heat was not also innate." Both these opinions, however, he rejects; and attempts a solution of the question on his favourite system, namely, the peripatetic philosophy: but his leading principles being erroneous, his deductions are of course inadmissible.

"To enter into a minute detail of all the opinions ² offered by the moderns on the cause of animal-heat, ³ ~~derms~~ would far exceed our limits. Most of them, however, may be referred to one or other of the three general causes of heat, viz. mixture, fermentation, and mechanical means, each of which we shall particularly consider.

"1. *Chemical mixture.* When chemical philosophy first came into vogue, and prevailed in the theory as well as practice of medicine, almost every operation in the animal machine was said to be the effect of ferment or mixture. From observing, that on the mixing of certain bodies far below the temperature of the human body, a degree of heat sometimes rising to actual inflammation was produced; they, without further investigation, pronounced mixture the sole cause of animal heat. Various, however, were the opinions, ⁴ not

¹ Opinions of the ancients concerning animal-heat.

Heat.

not only respecting the place where the mixture happened, but also concerning the nature of the fluids of which it consisted. Van Helmont, Sylvius, and several others, supposed that the mixture took place in the intestinal tube; and ascribed it to an effervescence between the pancreatic juice and the bile. Others discovered acids in one place, and alkalies in another; but the general opinion for near two centuries was, That acceſcent fluids taken in, meeting with others of an alkaline nature already prepared in the body, gave rise to the degree of heat peculiar to animals. But those who are in the least acquainted with the laws of the animal economy, need not be told that these opinions are mere conjectures, founded on facts gratuitously assumed. No experiments have shewn either an acceſcent or alkaleſcent in the bile that is ſufficient to unite with the other animal juices, and generate the heat of animals. But though we should admit the supposition in its full extent, still it would by no means be ſufficient to account for the ſtability of animal heat in different climates and seasons; its equality all over the body when in health; its partial increase in topical inflammations; or hardly indeed for any one phenomenon attending its production.

“ Since, then, it appears that the fluids supposed to be mixed, the place in which the mixture is made, and every other circumstance relating to it, are neither aſcertained nor ſecounded by analogy, none will, we preſume, hesitate to reject every hypothesis of the cause of animal-heat founded on the effects of mixture.

“ 2. *Fermentation.* When a more accurate and extensive knowledge of the various operations of nature had convinced phyſiologiſts of the abſurdity of explaining the vital functions of animals, and the ſeveral changes which take place in the living body by the effects of chemical mixture, fermentation was ſubſtituted in its ſtead. All had obſerved, that fermentation was generally accompanied by heat; and few were ignorant, that that identical proceſs, or one extremely ſimilar to it, was conſtantly going forward in living animals; and it was not without ſome appearance of truth, that phyſiologiſts attributed animal-heat to that cauſe.

“ Formerly there were various modifications of this opinion; but of late it has been chiefly confined to one ſpecies of fermentation, viz. the putrefactive, which indeed is more conſentaneous to experience and found philoſophy. For although animal-ſubſtances are either directly or indirectly produced from vegetables, as all animals live on vegetables, or on animals that have lived on them; and though they may be ultimately reſolved into the ſame principles; yet they are certainly combined in a different manner: for they conſtitute compounds, the natures of which are eſſentially different; and of the three ſtages of fermentation, the vinous, acetous, and putrid, the laſt is the only one to which they ſhew a tendency. Milk indeed tends to the acetous, and even to the vinous fermentation; but as it can hardly be conſidered as perfectly animalized, it ought not to be conſidered as an exception to the general poſition. And though it be readily admitted, that animal matter is extremely apt to putrefy, and that even in the living body there is a tendency to that proceſs; yet it may be ſhewn, that the degree to which it

VOL. V.

takes place can have little or no ſhare in generating the heat of animals. In the firſt place, the effect of any degree of putrefaction in producing heat, is to this day ſo ill aſcertained, that, with many ingenious philoſophers it is altogether problematical, whether or not animal ſubſtances, during the putrefactive proceſs, do ever generate heat. Neither M. Beaume nor Dr Pearſon, who made ſeveral accurate experiments with a view to aſcertain this point, could, by the aſſiſtance of the moſt ſenſible thermometers, diſcover the leaſt difference betwixt the temperature of the putrefying mixtures, and the ſurrounding medium; and were the putrefaction of animal-ſubſtances really attended with the generation of heat, we might expect to find it greater in proportion to the bulk of the putrefying maſs.

This, however, is not the caſe; for it has often been found, that the largeſt maſſes of animal matter, ſuch as the carcaſe of a large whale, laid out and expoſed to the air in ſuch a putrid condition as to affect all the neighbourhood with an intolerable ſtench, did not to the perſons handling it feel ſenſibly hotter than the circumambient air. But what at once overturns every thing that can be advanced in favour of the generation of animal-heat on the principles of putrefaction is, that heat is far more conſiderable in a living than in a dead body; and no rational phyſiologiſt will deny, that the putrid fermentation is going forward more rapidly in the latter than in the former.

“ 3. *The mechanical generation of heat.* This opinion firſt took took its riſe from an obſervation, that animal-heat generally keeps pace with the ſtate of the circulation: while the action of the heart and arteries continues unimpaired, a high degree of animal-heat is produced; but when that action becomes more languid, the heat of the animal is diminiſhed alſo. This, till very lately, was the favourite opinion of phyſicians, and was introduced immediately after Harvey had diſcovered the circulation of the blood, and indeed ſeems to be ſupported by many ſtriking facts. Phyſiologiſts looked upon it as a matter almoſt capable of mathematical demonſtration; yet they could not agree whether the heat of animals is occaſioned by the friction of the blood againſt the veſſels which contain it, or by the internal friction and agitation of the particles among one another. Various hypotheſes accordingly were framed, and many ingenious arguments brought in ſupport of them: but all ſuppoſitions of the mechanical kind are overthrown by ſome thermometrical obſervations of De Haen and others, from which it appeared, that the heat of the body was ſometimes greater than is uſual with healthy people, at the time the perſon was juſt expiring, when the action of the veſſels was very weak; nay, even after he was dead, when it had entirely ceaſed. The above-mentioned phyſician relates two very remarkable caſes of this kind. In the one, he found that the temperature of his patient, which during the courſe of an inflammatory fever had never exceeded 103 degrees, at the time he expired, and for two minutes after, ſtood at 106. From the other it appeared, that the heat of a perſon who was dying of a lingering diſtemper, roſe in the laſt agony from 100 to 101, and continued there ſtationary for two hours; and, even at the expiration of 15 hours, had only fallen to 85°, though the ſurrounding medium did not exceed 60°. The examples alſo of thoſe who

20 H

are

Heat.

Heat.

are suffocated by fixed air, entirely overturn not only the mechanical system, but almost every other which hath yet appeared on the subject. [See the article *Blood*, n° 31.]

³
Dr Cullen's
opinion,
with ob-
jections.

*Instit. of
Medicine*,
p. 124.

"One or other of the abovementioned hypotheses continued to be adopted by physicians, till Dr Cullen attempted a solution on a new set of principles; but, attentive to the diffidence with which novel opinions ought to be broached, he delivered his as little more than a mere conjecture. 'May it not (says he) be supposed, That there is some circumstance in the vital principle of animals, which is in common to those of the same class, and of like economy; and which determines the effect of motion upon the vital principle to be the same, though the motion acting upon it may be in different circumstances?'—The doctor was driven to this supposition from the difficulty he found in explaining how so many animals of a different age, size, and temperament, should possess very nearly the same degree of heat; and in which it is impossible to shew, that the motion of the blood in all its circumstances, is exactly the same; or that in the different animals in which the degree of heat is considerably different, the motion of the circulating mass is, in each, correspondent to the difference of temperature. But, granting that the degree of heat does not always obtain in an exact ratio with the motion of the blood, and that this is an insuperable objection to its mechanical generation, yet there appear no plausible grounds for supposing that the effect of motion may be the same, while the motion acting upon it is in different circumstances. By this Dr Cullen means, That the different temperature of different animals is owing to a difference of the vital principle, inasmuch that the velocity of the blood may be the same in a frog as in a man; and yet, in consequence of the different vital principle, the heat produced may be different. The facts upon which he seems to lay the greatest stress are, That neither where the surrounding medium considerably surpasses the temperature of the living body, nor where it is far below it, is there any sensible change in the heat of animals. These, and some similar facts, in appearance countenance his hypothesis; yet we have no solid reason for imagining the principle of life to be different in different animals. And how are we to conceive, that the same degree of motion should in one class of animals always produce a certain degree of heat, and in another class as regularly a different one? A proposition of such a nature should, no doubt, require the most obvious facts and conclusive arguments to establish it; but, in the present instance, we do not perceive any probable reason, even from analogy. Besides, to say that the principle of life can generate heat or cold, independent of chemical or mechanical means, is contrary to experience, and seems in itself absurd.

"In the 66th volume of the Philosophical Transactions, Dr Hunter, after reciting some experiments concerning animal-heat, asserts, That certain animals entirely destitute of nerves, are endowed with a power of generating their own heat; and this he brings as an *argumentum crucis* against those who account the nervous system the seat of animal-heat. If this is really a fact, it must, no doubt, have all the weight he ascribes to it; but it is plain that no stress can be

laid upon it, unless it was better ascertained, which it is evident it never can be. For though we can positively assert that nerves exist where we see them, yet we cannot affirm with equal certainty that they do not also exist where we are not able to discover them. For all anatomists allow, that there are thousands of nervous filaments so finely interwoven into the composition of the more perfect animals of every size, that they elude not only the knife and naked eye, but even the best optical instruments hitherto invented. Since then we admit the presence of nerves in one tribe of animals, though we can only perceive them in their effects; what solid reason have we to deny them in another, in which we have the very same evidence, viz. certain indications of sense and motion?

"Another theory, and perhaps the best supported which hath yet appeared on the subject, is that of Dr Black's. That excellent chemist having observed, That not only breathing animals are of all others the warmest, but also that there subsists such a close and striking connexion between the state of respiration and the degree of heat in animals, that they appear to be in an exact proportion to one another, was led to believe, that animal-heat depends on the state of respiration; that it is all generated in the lungs by the action of the air upon the principle of inflammability, in a manner little dissimilar to what he supposed to occur in actual inflammation; and that it is thence diffused by means of the circulation over the rest of the vital system.

"This opinion is supported by many forcible arguments. 1. It is pretty generally known to naturalists, that a quantity of mephitic phlogisticated air is constantly exhaling from the lungs of living animals.—Since, therefore, atmospheric air, by passing through the lungs, acquires the very same properties as by passing through burning fuel, or by being exposed to any other process of phlogistication, it is obvious, that the change which the common air undergoes in both cases, must be attributed to one and the same cause, viz. its combination with phlogiston. 2. It has likewise been urged in favour of the same hypothesis, That the celerity with which the principle of inflammability is separated in respiration, is very closely connected with the degree of heat peculiar to each animal. Thus, man, birds, and quadrupeds, vitiate air very fast; serpents, and all the amphibious kind, very slowly; and the latter are of a temperature inferior to the former, and breathe less frequently. 3. The most cogent arguments that have been brought in support of this opinion are, That no heat is generated till the function of respiration is established; and that the *fœtus in utero* derives all its heat from the mother."

Upon this theory our author makes the following observations, which we shall give in his own words.

"These arguments may, perhaps, on a superficial view of the question, appear conclusive; but a sound reasoner, who shall coolly and impartially weigh every circumstance, will, I am confident, allow that they only afford a very ambiguous and imperfect evidence of the doctrine they are meant to establish: and the subsequent animadversions on Dr Black's theory at large, will, it is hoped, suffice to shew, that it is not only founded on dubious and controvertible principles, but that

Heat.

⁴
Dr Black's
opinion.

⁵
Objections

thiaz

that it is, in every point of light, clogged with unmountable difficulties.

"I. Many and various are the proofs which evince the improbability of the lungs being the source or elaboratory of animal-heat: for, though it be granted, that there subsists a very striking connexion between the state of respiration and the degree of heat in animals, and that they are even in proportion to one another; yet it by no means ensues, that the former is positively the cause of the latter. For, were that really the case, it is obvious, that those animals which are destitute of the organs of respiration would generate no heat. That, however, is not true in fact: for those fishes which are even destitute of gills, appear from various experiments to be warmer than the ordinary temperature of the element in which they live; an irrefragable proof that the function of respiration is not absolutely necessary to the production of heat in animals.

"II. If the heat of living animals be generated solely in the lungs, two things necessarily follow: the first, That it can only be communicated to the other parts of the body through the channel of the arterial system; the second, That the heat must decrease as it recedes from its supposed centre. And a clear and satisfactory evidence of both these points will, no doubt, be deemed requisite to render Dr Black's opinion in any degree probable. So far, however, are we from meeting with those positive and convincing proofs which we had reason to expect, that we are not prevented with a single plausible argument in favour of either of the points. On the contrary, it is more conformable to facts, that the venal blood is, if not warmer, at least as warm as the arterial. Dr Stevenson, an ingenious and accurate physiologist, with a view to ascertain this matter, laid bare the jugular vein and carotid artery of a calf, and then tied and cut them off at once, in order to let equal quantities of blood flow, in a given time, into vessels of an equal capacity, in each of which he had placed a well-adjusted thermometer; the result of the experiment was, That the thermometer immersed in the venous blood rose several degrees above that placed in the arterial. But though it is probable that there is not such a difference as that experiment seems to make, yet several reasons incline me to think, that the venous blood, instead of being colder, as Dr Black maintains, is in fact somewhat warmer, than the arterial; and what entirely overturns his opinion is, That no experiment, though many have been made, has ever shewn that the temperature of the blood is higher in the left ventricle of the heart than in the right, which must necessarily be the case, were all the heat of the animal-body generated in the lungs.

"III. Having thus rendered it improbable that the generation of animal-heat should be entirely confined to the lungs, we shall venture a step farther, and endeavour to shew, that the vital fluid, so far from acquiring all its heat in the pulmonary system, communicates no inconsiderable portion of what it had received in the course of the circulation to the air alternately entering into that organ and issuing from it. Various are the arguments which tend to evince this opinion. Were the blood heated in the lungs, we should certainly need less of their function in a warm

than in a cold atmosphere; but we are taught by experience, that when the air is extremely hot, and we wish to be cooled, we breathe full and quick; and that when it is intensely cold, our respiration is slow and languid; which, were the blood heated in the lungs by the action of the air upon it, surely should not be the case. It is therefore more consonant with reason and experience, that the air which we inspire, by carrying off a quantity of evolved phlogiston from the lungs, rather contributes to diminish than increase the heat of breathing animals. Respiration, for this reason, has been very properly compared, by an ingenious physiologist, Dr Duncan of Edinburgh, to the blowing of bellows on a hot body. In both cases a considerable degree of heat is communicated to the air: but in neither can the air be said to generate any heat; for if it did, the heat of breathing animals should increase in proportion to the quantity of air inhaled, and a piece of inert matter heated to a certain degree should become hotter by ventilation.

"IV. The *fœtus in utero*, according to Dr Black's hypothesis, generates no heat. The arguments by which he supports that position, how ingenious soever they may be, seem not sufficiently cogent to produce conviction; and as the question from its nature hardly admits of any direct experiment, our reasoning upon it must necessarily be analogical. Hence arises our embarrassment; for, as the discovering of analogies depends on the quickness and fertility of fancy, and the truth of all analogical ratiocination on the acuteness and nicety of judgment, two powers of the soul seldom united in an eminent degree, we cannot wonder that arguments of this kind, which to one man seem unanswerable, should to another appear futile.

"The only plausible objection to the generation of heat in the *fœtus*, is, the supposition that it would in a short time accumulate in such a manner as to become incompatible with life.

"This argument, however, is more specious than solid; for, granting that the circulation which is carried on between the *fœtus* and the mother, transmits very nearly the temperature of her blood, that by no means entirely supercedes the necessity of heat being generated in it. Various reasons lead to this opinion.—It is an axiom, that heat decreases as it recedes from the source from which it sprang. Now, if we admit for a moment Dr Black's opinion, and believe the heat of animals to be generated solely in the lungs, is it not obvious, that before it reaches the uterus, passes through the very minute tubes by which that organ is connected to the placenta, circulates through the umbilical vessels, and pervades the extreme parts of the *fœtus*, it must be too much diminished to support that equilibrium which obtains in every part of the living system. Besides, as the *fœtus in utero* may properly enough be accounted a part of the mother, the same objections that are brought against the generation of heat in it would hold equally good against the production of heat in any part or organ of her body, except the lungs. But such a multitude of accurate thermometrical observations have evinced the partial increase of heat in local inflammations, that no room is left to doubt, that in every individual part of the vital frame heat is generated; and if the *fœtus* be, from any cause whatever, liable to topical inflammation,

Heat.

Heat.

6
Dr Duguid's theory.

mation, a thing which no physiologist has ever pretended to deny, what shadow of reason is there for doubting that such affections are accompanied with the same effects before as after birth, and consequently with a partial increase of heat?"

Our author having now, as he supposes, refuted the opinions of others, after shewing that heat though generated cannot accumulate in the fetus, proceeds to lay down his own theory, which depends on the following principles.

1. That the blood does contain phlogiston.
2. That this phlogiston is evolved, extricated, or brought into a state of activity and motion by the action of the blood vessels to which it is subjected in the course of circulation.

3. That the evolution of phlogiston is a cause which throughout nature produces heat, whether that heat be apparently excited by mixture, fermentation, percussion, friction, inflammation, ignition, or any similar cause.

4. That this heat, which must be produced in consequence of the evolution of the phlogiston from the blood of different animals, is in all probability equal to the highest degree of heat which these animals in any case possess.

7
Objections to it.

The first and second of these propositions will readily be granted: but the third is liable to a very great objection, namely, that from putrefying bodies, phlogiston is evolved in quantity sufficient to reduce to their metallic form the calces of some metals exposed to the vapour, as Dr Duguid hath acknowledged; yet he himself affirms, that no sensible heat is produced by putrefying animal-substances. To this he is obliged to reply, that phlogiston is extricated more slowly from mixtures undergoing the putrid fermentation, than from such as are undergoing the vinous and acetous ones; and that the volatile alkali produced from putrefying substances likewise hinders the action of the phlogiston. But the first part of this answer is not proved, and is what he himself calls only a *probable conjecture*. Neither doth the second appear to be well founded: for putrefying substances, urine excepted, afford but little volatile alkali; and even putrid urine itself, which affords such a large portion, is not colder than other putrid matters.

It is however needless to insist farther on this theory, since his fundamental principle, namely, That the venous blood is warmer than the arterial, hath been shewn to be false by Mr Adair Crawford, of whose hypothesis we must now give an account.

8
Mr Crawford's theory.

This gentleman, who, in his general doctrine of heat, seems to agree with Dr Irvin of Glasgow, begins with an explanation of his terms. The words *heat* and *fire*, he tells us, are ambiguous. *Heat* in common language has a double signification. It is used indiscriminately to express a sensation of the mind, and an unknown principle, whether we call it a *quality* or a *substance*, which is the exciting cause of that sensation. The latter, he, with Dr Irvin, calls *absolute heat*; the former, *sensible heat*. The following are the general facts upon which his experiments are founded.

1. Heat is contained in great quantities in all bodies when at the common temperature of the atmosphere.

2. Heat has a constant tendency to diffuse itself over all bodies, till they are brought to the same de-

gree of sensible heat.

3. If the parts of the same homogeneous body have the same degree of sensible heat, the quantities of absolute heat will be proportionable to the bulk or quantity of matter. Thus the quantity of absolute heat contained in two pounds of water, must be conceived to be double of that which is contained in one pound, when at the same temperature.

4. The mercurial thermometer is an accurate measure of the comparative quantities of absolute heat which are communicated to the same homogeneous bodies or separated from them, as long as such bodies continue in the same form. If therefore the sensible heat of a body, as measured by the mercurial thermometer, were to be diminished the one half, or the one third, or in any given proportion, the absolute heat would be diminished in the same proportion.

5. The comparative quantities of absolute heat which are communicated to different bodies, or separated from them, cannot be determined in a direct manner by the thermometer. Thus, if the temperature of a pound of mercury be raised one degree, and that of a pound of water one degree, as indicated by the thermometer, it does not by any means follow, that equal quantities of absolute heat have been communicated to the water and the mercury. [See HEAT and THERMOMETER.]—If a pint of mercury at 100° be mixed with an equal bulk of water at 50°, the change produced in the heat of the mercury will be to that produced in the water, as three to two: from which it may be inferred, that the absolute heat of a pint of mercury is to that of an equal bulk of water, as two to three; or, in other words, that the comparative quantities of their absolute heats are reciprocally proportionable to the changes which are produced in their sensible heats, when they are mixed together at different temperatures. This rule, however, does not apply to those mixtures which generate sensible heat or cold by chemical action.

From the above position, says Mr Crawford, it follows, that equal weights of heterogeneous substances, as air and water, having the same temperature, may contain unequal quantities of absolute heat. There must, therefore, be certain essential differences in the nature of bodies, in consequence of which some have the power of collecting and retaining the element of fire in greater quantities than others, and these differences he calls throughout his treatise the *capacities* of bodies for containing heat.

Having premised these general facts, our author gives an account of a number of experiments made, in order to ascertain the quantity of absolute heat contained in different bodies. These experiments were made by mixing the bodies to be examined with water, heated to different degrees; and by the temperature of the mixture, he found the proportion of the capacity of the bodies for containing heat, to water, and, of consequence, to one another. Thus he found the capacity of wheat for containing heat to be to that of water, as 1 to 2.9; and, of consequence, the absolute heats of the two substances to be in the same proportion. The absolute heat of oats to that of water he found as 1 to 2.7; of barley, as 1 to 2.4; of beans, as 1 to 1.6; of flesh, as 1 to 1.3; of milk, as 1 to 1.1; and of a mixture of venous and arterial blood

blood from a sheep, as 25.4 to 24.4. By other experiments he determined, that the absolute heat of venous blood was to that of water, only as 100 to 112, whereas the absolute heat of arterial blood was to that of water, as 100 to 97.08.

By experiments made with air of different kinds contained in bladders, and immersed in water, he found that the absolute heat of atmospheric air was exceedingly great, being to that of water as 18.6 to 1; that of dephlogisticated air was still greater, being to the heat of common atmospheric air as 4.6 to 1. The heat of phlogisticated and fixed air was much less; that of the latter, particularly, being to the heat of atmospheric air only as 1 to 67.

From other experiments made on metals, Mr Crawford concludes, that the absolute heat of tin, in its metallic state, is to that of water as 1 to 14.7; but the heat of calcined tin is to that of water as 1 to 10.4. In like manner, the heat of iron was to that of water only as 1 to 8; but that of the calx of iron was to the heat of water as 1 to 3.1, &c. And from these experiments he is of opinion, that the more phlogiston that is added to any body, the less is its capacity for containing heat.

From these experiments our author deduces the following theory of animal-heat.—“It has been proved, that the air, which is expired from the lungs of animals, contains less absolute heat than that which is inhaled in inspiration. It has been shown, particularly, that, in the process of respiration, atmospheric air is converted into fixed air; and that the absolute heat of the former is to that of the latter, as 67 to 1.

“Since, therefore, the fixed air which is exhaled by expiration is found to contain only the one sixtieth part of the heat which was contained in the atmospheric air previous to inspiration, it follows, that the latter must necessarily deposit a very great proportion of its absolute heat in the lungs. It has moreover been shown, that the absolute heat of florid arterial blood is to that of venous as $11\frac{1}{2}$ to 10. And hence, as the blood, which is returned by the pulmonary vein to the heart, has the quantity of its absolute heat increased, it is evident that it must have acquired this heat in its passage through the lungs. We may conclude, therefore, that in the process of respiration, a quantity of absolute heat is separated from the air and absorbed by the blood.

“That heat is separated from the air in respiration, is farther confirmed by the experiment with phlogisticated air; from which, compared with Dr Priestley’s discoveries, it is manifest, that the power of any species of air in supporting animal-life, is nearly in proportion to the quantity of absolute heat which it contains, and is consequently proportionable to the quantity which it is capable of depositing in the lungs.

“The truth of this conclusion will perhaps appear in a clearer light from the following calculation, by which we may form some idea of the quantity of heat yielded by atmospheric air when it is converted into fixed air, and also of that which is absorbed during the conversion of venous into arterial blood.

“We have seen, that the same heat, which raises atmospheric air one degree, will raise fixed air nearly 67 degrees; and consequently, that the same

heat, which raises atmospheric air any given number of degrees, will raise fixed air the same number of degrees multiplied by 67. In the Peterburgh experiment of freezing quicksilver, the heat was diminished 200 degrees below the common temperature of the atmosphere. We are therefore certain, that atmospheric air, when at the common temperature of the atmosphere, contains at least 200 degrees of heat. Hence, if a certain quantity of atmospheric air, not in contact with any body that would immediately carry off the heat, should suddenly be converted into fixed air, the heat which was contained in the former would raise the latter 200 degrees multiplied by 67, or 13400 degrees. And the heat of red hot iron being 1050, it follows that the quantity of heat, which is yielded by atmospheric air when it is converted into fixed air, is such, (if it were not dissipated), as would raise the air so changed to more than 12 times the heat of red-hot iron.

“If, therefore, the absolute heat which is disengaged from the air in respiration, were not absorbed by the blood, a very great degree of sensible heat would be produced in the lungs.

“Again, it has been proved, that the same heat which raises venous blood 115 degrees, will raise arterial only 100 degrees; and consequently, that the same heat, which raises venous blood any given number of degrees, will raise arterial a less number, in the proportion of 100 to 115, or 20 to 23. But we know that venous blood contains at least 230 degrees of heat. Hence, if a certain quantity of venous blood, not in contact with any body that would immediately supply it with heat, should suddenly be converted into arterial, the heat which was contained in the former would raise the latter only $\frac{23}{115}$ of 230 degrees, or 200 degrees; and consequently the sensible heat would suffer a diminution, equal to the difference between 230 and 200, or 30 degrees. But the common temperature of blood is 96; when, therefore, venous blood is converted into arterial in the lungs, if it were not supplied by the air with a quantity of heat proportionable to the change which it undergoes, its sensible heat would be diminished 30 degrees, or it would fall from 96 to 66.

“That a quantity of heat is detached from the air, and communicated to the blood, in respiration, is moreover supported by the experiments with metals and their calces: from which it appears, that when bodies are joined to phlogiston, they lose a portion of their absolute heat; and that, when the phlogiston is again disengaged, they reabsorb an equal portion of heat from the surrounding bodies.

“Now it has been demonstrated by Dr Priestley, that in respiration, phlogiston is separated from the blood and combined with the air. During this process, therefore, a quantity of absolute heat must necessarily be disengaged from the air, by the action of the phlogiston; the blood, at the same moment, being left at liberty to unite with that portion of heat which the air had deposited.

“And hence animal-heat seems to depend upon a process similar to a chemical elective attraction. The air is received into the lungs, containing a great quantity of absolute heat. The blood is returned from the

the extremities, highly impregnated with phlogiston. The attraction of the air to the phlogiston, is greater than that of the blood. This principle will, therefore, leave the blood to combine with the air. By the addition of the phlogiston, the air is obliged to deposit a part of its absolute heat; and as the capacity of the blood is at the same moment increased by the separation of the phlogiston, it will instantly unite with that portion of heat which had been detached from the air.

"We learn from Dr Priestley's experiments with respect to respiration, that arterial blood has a strong attraction to phlogiston: it will consequently, during the circulation, imbibe this principle from those parts which retain it with least force, or from the putrescent parts of the system: and hence the venous blood, when it returns to the lungs, is found to be highly impregnated with phlogiston. By this impregnation, its capacity for containing heat is diminished. In proportion, therefore, as the blood, which had been dephlogisticated by the process of respiration, becomes again combined with phlogiston in the course of the circulation, it will gradually give out that heat which it had received in the lungs, and diffuse it over the whole system.

"Thus it appears, that, in respiration, the blood is continually discharging phlogiston and absorbing heat; and that, in the course of the circulation, it is continually imbibing phlogiston and emitting heat.

"It may be proper to add, that as the blood, by its impregnation with phlogiston, has its capacity for containing heat diminished; so on the contrary, those parts of the system from which it receives this principle, will have their capacity for containing heat increased, and will consequently absorb heat.

"Now if the changes in the capacities, and the quantities of matter changed in a given time, were such, that the whole of the absolute heat separated from the blood were absorbed, it is manifest that no part of the heat which is received in the lungs would become sensible in the course of the circulation.

"That this, however, is not the case, will, I think, be evident from the following considerations:

"We know that sensible heat is produced by the circulation of the blood; and we have proved by experiment, that a quantity of absolute heat is communicated to that fluid in the lungs, and is again disengaged from it in its progress through the system. If, therefore, the whole of the absolute heat, which is separated from the blood, were absorbed by those parts of the system from which it receives the phlogiston, it would be necessary to have recourse to some other cause, to account for the sensible heat which is produced in the circulation. But, by the rules of philosophising, we are to admit no more causes of natural things than such as are both true and sufficient to explain the appearances; for nature delights in simplicity, and affects not the pomp of superfluous causes.

"We may, therefore, safely conclude, that the absolute heat which is separated from the air in respiration, and absorbed by the blood, is the true cause of animal-heat.

"It must nevertheless be granted, that those parts of the system which communicate phlogiston to the

blood, will have their capacity for containing heat increased; and therefore, that a part of the absolute heat which is separated from the blood will be absorbed.

"But from the quantity of heat, which becomes sensible in the course of the circulation, it is manifest that the portion of heat which is thus absorbed is very inconsiderable.

"It appears, therefore, that the blood, in its progress through the system, gives out the heat which it had received from the air in the lungs: a small portion of this heat is absorbed by those particles which impart the phlogiston to the blood; the rest becomes redundant, or is converted into moving and sensible heat."

Mr Crawford's theory, which doth not essentially differ from Dr Black's, seems to be the best that hath yet appeared. There is, however, one difficulty which seems common to them all, and which, even on Mr Crawford's principles, seems not to admit of solution. The subject still uncertain.

If animal-heat entirely depends on something peculiar to a living body, why doth it sometimes continue after life hath ceased? If heat depends on the evolution of phlogiston by the action of the blood-vessels, according to Dr Dugud, why should it remain when these vessels cease to act, as, according to Dr Dugud himself, it sometimes doth? If, according to Mr Crawford, it is every moment attracted from the air, why is it not always in proportion to the respiration? Or, if fixed air contains such a small proportion of absolute heat as, by Mr Crawford's experiments, it seems to do, why doth it impart such a strong and lasting degree of heat to the bodies of those who are killed by it? See the article BLOOD, n^o 31. The conjecture mentioned under that article, n^o 32, is therefore still probable, namely, that animal-heat is occasioned by the elastic principle of fixed air; tho' in what manner it is occasioned, seems to be problematical.

Internal HEAT of the Earth. That there is a very considerable degree of heat always felt in digging to great depths in the earth, is agreed upon by all naturalists: but the quantity of this heat hath seldom been measured in any part; much less is it known, whether, in digging to an equal depth in different parts of the earth, the heat is found always the same. In digging mines, wells, &c. they find that at a little depth below the surface it feels cold. A little lower it is colder still, as being beyond any immediate influence of the sun's rays; inasmuch, that water will freeze almost at any season of the year: but when we go to the depth of 40 or 50 feet, it begins to grow warm, so that no ice can bear it; and then the deeper we go, still the greater the heat, until at last respiration grows difficult, and the candles go out.

This heat of the earth hath been variously explained. Some have had recourse to an immense body of fire lodged in the centre of the earth, which they consider as a central sun, and the great principle of the generation, vegetation, nutrition, &c. of fossil and vegetable bodies. But Mr Boyle, who had been at the bottom of some mines himself, suspects that this degree of heat, at least in some of them, may arise from the peculiar nature of the minerals generated therein. To confirm this, he inclines a mineral of a vitriolic kind, dug up in large quantities in many parts of England, which by the bare affusion of common water will grow

Heat.

so hot, that it will almost take fire.—These hypotheses are liable to the following objections. 1. If there is within the earth a body of actual fire, it seems difficult to shew why that fire should not consume and moulder away the outer shell of earth, till either the earth was totally destroyed, or the fire extinguished. 2. If the internal heat of the earth is owing to the action of water upon mineral substances, that action thro' time must have ceased, and the heat have totally vanished; but we have no reason to think, that the heat of the earth is any thing less just now than it was a thousand years ago. The phenomenon is easily explained by the propositions laid down under the article HEAT. If heat is nothing else than a certain mode of action in the ethereal fluid, or the matter of light, by which it flows out from a body in all directions as radii drawn from the centre to the circumference of a circle; it will then follow, that if an opaque body absorbs any considerable quantity of light, it must necessarily grow hot. The reason of this is plain. The body can hold no more than a certain quantity of ethereal matter; if more is continually forcing itself in, that which has already entered must go out. But it cannot easily get out, because it is hindered by the particles of the body among which it is detained. It makes an effort therefore in all directions to separate these particles from each other; and hence the body expands, and the effort of the fluid to escape is felt when we put our hands on the body, which we then say is hot. Now as the earth is perpetually absorbing the ethereal matter, which comes from the sun in an immense stream, and which we call his *light*, it is plain, that every pore of it must have been filled with this matter long ago. The quantity that is lodged in the earth, therefore, must be continually endeavouring to separate its particles from each other, and consequently must make it hot. The atmosphere, which is perpetually receiving that portion of the ethereal matter which issues from the earth, counteracts the force of the internal heat, and cools the external surface of the earth, and for a considerable way down; and hence the earth for 20 or 30 feet down, shews none of that heat which is felt at greater depths. See HEAT.

HEAT, in medicine. Great heats are not so much the immediate, as the remote, cause of a general sickness, by relaxing the fibres, and disposing the juices to putrefaction; especially among soldiers and persons exposed the whole day to the sun: for the greatest heats are seldom found to produce epidemic diseases, till the perspiration is stopped by wet clothes, fogs, dews, damps, &c.; and then some bilious or putrid distemper is the certain consequence, as fluxes and ardent intermitting fevers. Nevertheless, it must be allowed, that heats have sometimes been so great as to prove the more immediate cause of particular disorders; as when centinels have been placed without cover, or frequent reliefs in scorching heats; or when troops march or are exercised in the heat of the day; or when people imprudently lie down and sleep in the sun. All these circumstances are apt to bring on distempers, varying according to the season of the year. In the beginning of summer, these errors produce inflammatory fevers; and in autumn, a remitting fever or dysentery. To prevent, therefore, the effects of immoderate heats, commanders have found it expedient so to order the

marches, that the men come to their ground before the heat of the day; and to give strict orders, that none of them sleep out of their tents, which, in fixed encampments, may be covered with boughs to shade them from the sun. It is likewise a rule of great importance to have the soldiers exercised before the cool of the morning is over; for by that means not only the sultry heats are avoided, but the blood being cooled, and the fibres braced, the body will be better prepared to bear the heat of the day. Lastly, in very hot weather, it has often been found proper to shorten the centinels duty, when obliged to stand in the sun.

HEATH, in botany. See ERICA.

Berry-bearing HEATH. See EMPETRUM.

HEATHENS, in matters of religion. See PAGANS.

HEAVEN, literally signifies the expanse of the firmament, surrounding our earth, and extended every way to an immense distance.

The Hebrews acknowledged three heavens: the first the aerial heaven, in which the birds fly, the winds blow, and the showers are formed; the second, the firmament, in which the stars are placed; the third, the heaven of heavens, the residence of the Almighty, and the abode of saints and angels.

Heaven is considered by Christian divines and philosophers, as a place in some remote part of infinite space, in which the omnipresent Deity is said to afford a nearer and more immediate view of himself, and a more sensible manifestation of his glory, than in the other parts of the universe. This is often called the *empyrean*, from that splendor with which it is supposed to be invested; and of this place the inspired writers give us the most noble and magnificent descriptions.

The Pagans considered heaven as the residence only of the celestial gods, into which no mortals were admitted after death, unless they were deified. As for the souls of good men, they were consigned to the *elysian fields*. See ELYSIAN-FIELDS.

HEBDOMARY, a solemnity of the ancient Greeks, in honour of Apollo, in which the Athenians sung hymns to his praise, and carried in their hands branches of laurel. The word signifies the *seventh day*, this solemnity being observed on the seventh day of every lunar month.

HEBE, in fabulous history, the daughter of Juno without a father, was the goddess of Youth, and cup-bearer to Jupiter; who afterwards displaced her, and put Ganymede in her room. When Hercules was made a god, she was married to him, and then the restored Iolaus to his former youth. See IOLAUS.

HEBER, the son of Salah, and father of Peleg, from whom the Hebrews derived their name, according to Josephus, Eusebius, Jerome, Bede, and most of the interpreters of the sacred writings; but Huet bishop of Avranches, in his Evangelical Demonstration, has attempted to prove, that the Hebrews took their name from the word *heber*, which signifies *beyond*, because they came from beyond the Euphrates. Heber is supposed to have been born 2281 years B. C. and to have lived 464 years.

HEBRAISM, an idiom, or manner of speaking, peculiar to the Hebrew language. See the next article.

Heath

Hebraism.

HEBREW, or HEBREW Language, that spoken by the ancient Jews, and wherein the old Testament is wrote.

This appears to be the most ancient of all the languages in the world, at least we know of none older; and some learned men are of opinion, that this is the language in which God spoke to Adam in Paradise.

The books of the Old Testament are the only pieces to be found, in all antiquity, written in pure Hebrew; and the language of many of these is extremely sublime: it appears perfectly regular, and particularly so in its conjugations. Indeed, properly speaking, it has but one conjugation; but this is varied in each seven or eight different ways, which has the effect of so many different conjugations, and affords a great variety of expressions to represent by a single word the different modifications of a verb, and many ideas which in the modern and in many of the ancient and learned languages cannot be expressed without a periphrasis.

The primitive words, which are called *roots*, have seldom more than three letters or two syllables.

In this language there are 22 letters, only five of which are usually reckoned vowels, which are the same with ours, viz. *a, e, i, o, u*; but then each vowel is divided into two, a long and a short, the found of the former being somewhat grave and long, and that of the latter short and acute: it must however be remarked, that the two last vowels have sounds that differ in other respects besides quantity and a greater or less elevation. To these 10 or 12 vowels may be added others, called *semi-vowels*, which serve to connect the consonants, and to make the easier transitions from one to another. The number of accents in this language are, indeed, prodigious: of these there are near 40, the use of some of which, notwithstanding all the inquiries of the learned, are not yet perfectly known. We know, in general, that they serve to distinguish the sentences like the points called *commas, semicolons, &c.* in our language; to determine the quantity of the syllables; and to mark the tone with which they are to be spoken or sung. It is no wonder, then, that there are more accents in the Hebrew than in other languages, since they perform the office of three different things, which in other languages are called by different names.

HEBREWS, the descendants of Heber, commonly called *Jews*. See *HEBER* and *JEWS*.

HEBREWS, or *Epistle to the HEBREWS*, a canonical book of the New Testament.

Though St Paul did not prefix his name to this epistle, the concurrent testimony of the best authors ancient and modern afford such evidence of his being the author of it, that the objections to the contrary are of little or no weight.

The Hebrews, to whom this epistle was wrote, were the believing Jews of Palestine; and its design was to convince them, and by their means all the Jewish converts whosoever dispersed, of the insufficiency and abolishment of the ceremonial and ritual law.

HEBRIDES, the general name of some islands lying to the north-west of Scotland, of which kingdom they constitute a part. They are situated between the 55th and 59th degrees of latitude, are supposed to be

about 300 in number, and to contain 48,000 inhabitants. The names of the largest are *SKIE, MULK, ILAY, and ARRAN*. Of these islands Mr Pennant hath given the following history.

"The leisure of a calm gave ample time for reflection on the history and great events of the islands now in view, and of the others the objects of the voyage. In justice to that able and learned writer, the rev. Dr John Macpherison, late minister of Slate in Skie, let me acknowledge the assistance I receive from his ingenious essay on this very subject: for his labours greatly facilitate my attempt; not undertaken without consulting the authors he refers to; and adding numbers of remarks overseen by him, and giving a considerable continuation of the history. It would be an ostentatious task to open a new quarry, when such heaps of fine materials lie ready to my hand.

"All the accounts left us by the Greek and Roman writers are enveloped with obscurity; at all times brief, even in their descriptions of places they had easiest access to, and might have described with the most satisfactory precision; but in remote places, their relations furnish little more than hints, the food for conjecture to the visionary antiquary.

"That Pytheas, a traveller mentioned by Strabo, had visited Great Britain, I would wish to make only *apocryphal*. He asserts, that he visited the remoter parts; and that he had also seen Thule, the land of romance amongst the ancients: which all might pretend to have seen; but every voyager, to swell his fame, made the island he saw last, the Ultima Thule of his travels. If Pytheas had reached these parts, he might have observed, floating in the seas, multitudes of gelatinous animals, the *medusæ* of Linnaeus, and out of these have formed his fable: he made his *THULE a composition of neither earth, sea, nor air; but like a composition of them all*; then, catching his simile from what floated before him, compares it to the *lungs* of the sea, the Aristotelian idea of these bodies; and from him adopted by naturalists, successors to that great philosopher. Strabo very justly explodes these absurd tales; yet allows him merit in describing the climate of the places he had seen. As a farther proof of his having visited the Hebrides, he mentions their unfriendly sky, that prohibits the growth of the finer fruits; and that the natives are obliged to carry their corn under shelter, to beat the grain out, lest it should be spoiled by the defect of sun and violence of the rains. This is the probable part of his narrative; but when the time that the great geographer wrote is considered, at a period that these islands had been neglected for a very long space by the Romans, and when the difficulties of getting among a fierce and unfriendly nation must be almost insuperable, doubts innumerable, respecting the veracity of this relation, must arise. All that can be admitted in favour of him, is, That he was a great traveller: and that he might have either visited Britain, from some of the nations commercing with our isle; or received from them accounts, which he afterwards dressed out, mixed with the ornaments of fable. A traffic must have been carried on with the very northern inhabitants of our islands in the time of Pytheas; for one of the articles of commerce mentioned by Strabo, the ivory bits, were made either of the teeth of the walrus, or of a species of whale native of the northern seas.

"The

Tour in
Scotland,
ii. 200.

"The geographer Mela, who flourished in the reign of Claudius, is the next who takes notice of our lesser islands. He mentions the Orades as consisting of 30; the *Æmodæ* of seven. The Romans had then made a conquest of the former, and might have seen the latter; but, from the words of the historian, it is probable that the Shetland islands were those intended; for he informs us, that the "*Æmodæ* were carried out over against Germany;" the site of the Hebrides will not admit this description, which agrees very well with the others; for the ancients extended their Germany, and its imaginary islands, to the extreme north.

"Pliny the elder is the next that mentions these remote places. He lived later than the preceding writers, and of course his information is fuller: by means of intervening discoveries, he has added ten more to the number of the Orades; is the first writer that mentions the *Hæbudes*, the islands in question; and joins in the same line the *Æmodæ*, or, as it is in the best editions more properly written, the *Acmodæ*, or extreme point of the Roman expeditions to the north, as the Shetland isles in the highest probability were. Pliny and Mela agree in the number of the *Æmodæ*, or *Acmodæ*: the former makes that of the *Hæbudes* 30; an account extremely near the truth, deducting the little isles, or rather rocks, that surround most of the greater, and many of them too indistinct as scarcely to be remarked, except on an actual survey.

"Solinus succeeds Pliny. If he, as is supposed, was cotemporary with Agricola, he has made very ill use of the light he might have received from the expeditions of that great general: his officers might have furnished the historian with better materials than those he has communicated. He has reduced the number of the *Hæbudes* to five. He tells us, that "the inhabitants were unacquainted with corn: that they lived only on fish and milk: that they had one king, as the islands were only separated from each other by narrow straits: that their prince was bound by certain rules of government, to do justice; and was prevented by poverty from deviating from the true course, being supported by the public, and allowed nothing that he could call his own, not even a wife; but then he was allowed free choice, by turns one out of every district, of any female that caught his affection; which deprived him of all ambition about a successor.

"By the number of these islands, and by the minute attention given by the historian to the circumstance of their being separated from each other by very narrow straits, I should imagine, that which is now called the *Long island*, and includes Lewis, North Uist, Benbecula, South Uist, and Barra, to have been the five *Hæbudes* of Solinus; for the other great islands, such as Skie, &c. are too remote from each other to form the preceding very characteristic description of that chain of islands. These might naturally fall under the rule of our petty prince; almost the only probable part of Solinus's narrative.

"After a long interval appears Ptolemy, the Egyptian geographer. He also enumerates five *Ebudæ*; and has given each a name: the western, *Ebudæ*; the eastern, *Ricina*, *Maleos*, *Epidium*. Camden conjectures them to be the modern Skie, Lewis, Rathay or Raeline, Mull, and Ilay: and I will not controvert

his opinion.

"The Roman historians give very little light into the geography of these parts. Tacitus, from whom most might have been expected, is quite silent about the names of places; notwithstanding, he informs us, that a fleet by the command of Agricola performed the circumnavigation of Britain. All that he takes notice of is the discovery and the conquest of the Orkneys: it should seem, that with the biographers of an ambitious nation, nothing seemed worthy of notice, but what they could dignify with the glory of victory.

"It is very difficult to assign a reason for the change of name from *Ebudæ* to *Hebrides*: the last is modern; and seems, as the annotator on Dr Macpheron supposes, to have arisen from the error of a transcriber, who changed the *u* into *ri*.

"From all that has been collected from the ancients, it appears, that they were acquainted with little more of the Hebrides than the bare names: it is probable, that the Romans, either from contempt of such barren spots, from the dangers of seas, the violence of the tides, and horrors of the narrow sounds, in the inexperienced ages of navigation, never attempted their conquest, or saw more of them than what they had in sight during the few circumnavigations of Great Britain, which were expeditions more of ostentation than of utility.

"The inhabitants had probably for some ages their own governors; one little king to each island, or to each groupe as necessity required. It is reasonable to suppose, that their government was as much divided as that of Great Britain, which, it is well known, was under the direction of numbers of petty princes before it was reduced under the power of the Romans.

"No account is given in history of the time these islands were annexed to the government of Scotland. If we may credit our Saxon historians, they appear to have been early under the dominion of the Picts; for Bede and Adamnanus informs, that soon after the arrival of St Columba in their country, Brudeus, a Pictish monarch, made the saint a present of the celebrated island of Iona.

"But neither the holy men of this island, nor the natives of the rest of the Hebrides, enjoyed a permanent repose after this event.

"The first invasion of the Danes does not seem to be easily ascertained. It appears that they ravaged Ireland, and the isle of Rathay, as early as the year 735. In the following century, their expeditions became more frequent: Harold Harfager, or the *light-haired*, pursued, in 875, several petty princes, whom he had expelled out of Norway; who had taken refuge in the Hebrides, and molested his dominions by perpetual descents from those islands. He seems to have made a rapid conquest: he gained as many victories as he fought battles; he put to death the chief of the pirates, and made an indiscriminate slaughter of their followers. Soon after his return, the islanders repossessed their ancient seats: and, in order to repress their insults, he sent Ketil the *fat-nosed*, with a fleet and some forces for that purpose. He soon reduced them to terms, but made his victories subservient to his own ambition: he made alliances with the *reguli* he had

Hebrides.

subdued; he formed intermarriages, and confirmed to them their old dominions. This effected, he sent back the fleet to Harold; openly declared himself independent; made himself prince of the Hebrides; and caused them to acknowledge him as such, by the payment of tribute and the badges of vassalage. Ketil remained, during life, master of the islands; and his subjects appear to have been a warlike set of freebooters, ready to join with any adventurers. Thus when Eric, son of Harold Harfager, after being driven out of his own country, made an invasion of England, he put with his fleet into the Hebrides, received a large reinforcement of people fired with the hopes of prey, and then proceeded on his plan of rapine. After the death of Ketil, a kingdom was in after-times composed out of them, which, from the residence of the little monarch in the isle of Man, was styled that of *Man*. The islands became tributary to that of Norway for a considerable time, and princes were sent from thence to govern; but at length they again shook off the yoke. Whether the little potentates ruled independent, or whether they put themselves under the protection of the Scottish monarchs, does not clearly appear; but it is reasonable to suppose the last, as Donald-bane is accused of making the Hebrides the price of the assistance given him by the Norwegians against his own subjects. Notwithstanding they might occasionally seek the protection of Scotland, yet they never were without princes of their own: policy alone directed them to the former. From the chronicles of the kings of Man we learn, that they had a succession of princes.

"In 1089 is an evident proof of the independency of the islanders on Norway; for, on the death of Lagman, one of their monarchs, they sent a deputation to O'Brian king of Ireland, to request a regent of royal blood to govern them during the minority of their young prince. They probably might in turn compliment in some other respects their Scottish neighbours: the islanders must have given them some pretence to sovereignty; for,

"In 1093, Donald-bane, king of Scotland, calls in the assistance of Magnus the Barefooted, king of Norway, and bribes him with the promise of all the islands. Magnus accepts the terms; but at the same time boasts, that he does not come to invade the territories of others, but only to resume the ancient rights of Norway. His conquests are rapid and complete; for, besides the islands, by an ingenious fraud he adds Cantyre to his dominions.

"The Hebrides continued governed by a prince dependent on Norway, a species of viceroy appointed by that court; and who paid, on assuming the dignity, ten marks of gold, and never made any other pecuniary acknowledgment during life: but if another viceroy was appointed, the same sum was exacted from him. These viceroys were sometimes Norwegians, sometimes natives of the isles. In 1097 we find, that Magnus deputed a nobleman of the name of Ingemund: in after-times we learn, that natives were appointed to that high office. Thus were the Hebrides governed, from the conquest by Magnus, till the year 1263, when Acho, or Haquin, king of Norway, by an unfortunate invasion of Scotland, terminating in his defeat at Largs, so weakened the powers of his

Hebrides.

kingdom, that his successor Magnus IV. was content to make a cession of the islands to Alexander III.; but not without stipulating for the payment of a large sum, and of a tribute of a hundred marks for ever, which bore the name of the *annual of Norway*. Ample provision was also made by Magnus in the same treaty, for the security of the rights and properties of his Norwegian subjects, who chose to continue in the isles; where many of their posterity remain to this day.

"Notwithstanding this revolution, Scotland seems to have received no real acquisition of strength. The islands still remained governed by powerful chieftains, the descendants of Somerled, thane of Heregaidel, or Argyle, who, marrying the daughter of Olave, king of Man, left a divided dominion to his sons Dugal and Reginald: from the first were descended the Macdougals of Lorn; from the last, the powerful clan of the Macdonalds. The lordship of Argyle, with Mull, and the islands north of it, fell to the share of the first; Ilay, Cantyre, and the southern isles, were the portion of the last: a division that formed the distinction of the Sudereys and Nordereys, [as farther noticed in the article *IONA*.]

"These chieftains were the scourges of the kingdom: they are known in history but as the devastators of a tempest; for their paths were marked with the most barbarous desolation. Encouraged by their distance from the seat of royalty, and the turbulence of the times, which gave their monarchs full employ, they exercised a regal power, and often assumed the title; but are more generally known in history by the style of the *lord of the isles*, or the earls of Rofs; and sometimes by that of the *Great Macdonald*.

"Historians are silent about their proceedings, from the retreat of the Danes, in 1263, till that of 1335, when John, lord of the isles, withdrew his allegiance. In the beginning of the next century his successors were so independent, that Henry IV. entered into a formal alliance with the brothers Donald and John. This encouraged them to commit fresh hostilities against their natural prince. Donald, under pretence of a claim to the earldom of Rofs, invaded and made a conquest of that county; but penetrating as far as the shire of Aberdeen, after a fierce but undecided battle with the royal party, thought proper to retire, and in a little time to swear allegiance to his monarch James I. But he was permitted to retain the county of Rofs, and assume the title of earl. His successor, Alexander, at the head of 10,000 men, attacked and burnt Inverness; at length, terrified with the preparations made against him, he fell at the royal feet, and obtained pardon as to life, but was committed to strict confinement.

"His kinsman and deputy, Donald Balloch, representing the imprisonment of his chieftain, excited another rebellion, and destroyed the country with fire and sword: but on his flight was taken and put to death by an Irish chieftain, with whom he fought protection.

"These barbarous inroads were very frequent with a set of banditti, who had no other motive in war but the infamous inducement of plunder.

"In the reign of James II. in the year 1461, Donald, another petty tyrant, an earl of Rofs, and lord of the isles, renewed the pretence of independency; fur-

surprised the castle of Inverness; forced his way as far as Athol; and obliged the earl and countess, with the principal inhabitants, to seek refuge in the church of St Bridget, in hopes of finding security from his cruelty by the sanctity of the place: but the barbarian and his followers set fire to the church, put the ecclesiastics to the sword, and, with a great booty, carried the earl and countess prisoners to his castle of Claig, in the island of Ilay. In a second expedition, immediately following the first, he suffered the penalty of his impiety: a tempest overtook him, and overwhelmed most of his associates; and he, escaping to Inverness, perished by the hands of an Irish harper: his surviving followers returned to Ilay, conveyed the earl and countess of Athol to the sanctuary they had violated, and expiated their crime by restoring the plunder, and making large donations to the shrine of the offended saint.

"John, successor to the last earl of Ross, entered into alliance with Edward IV. and sent ambassadors to the court of England, where Edward empowered the bishop of Durham and earl of Winchester to conclude a treaty with him, another Donald Balloch, and his son and heir John. They agreed to serve the king with all their power, and to become his subjects: the earl was to have a hundred marks sterling for life in time of peace, and two hundred pounds in time of war; and these island allies, in case of the conquest of Scotland, were to have confirmed to them all the possessions benorth of the Scottish sea; and in case of a truce with the Scottish monarch, they were to be included in it. But about the year 1476, Edward, from a change of politics, courted the alliance of James III. and dropt his new allies. James, determined to subdue this rebellious race, sent against them a powerful army, under the earl of Athol; and took leave of him with this good wish, *Furth, Fortune, and fill the fetters*; as much as to say, "Go forth, be fortunate, and bring home many captives;" which the family of Athol have used ever since for its motto. Ross was terrified into submission; obtained his pardon; but was deprived of his earldom, which by act of parliament was then declared unalienably annexed to the crown: at the same time the king restored to him Knapdale and Cantyre, which the earl had resigned; and invested him anew with the lordship of the isles, to hold them of the king by service and relief.

"Thus the great power of the isles was broken: yet for a considerable time after, the petty chieftains were continually breaking out into small rebellions, or harassed each other in private wars; and tyranny seems but to have been multiplied. James V. found it necessary to make the voyage of the isles in person, in 1536; seized and brought away with him several of the most considerable leaders; and obliged them to find security for their own good behaviour, and that of their vassals. The names of these chieftains were (according to Lindesey), *Mydyart, Mac-connel, Mac-loyd of the Lewis, Mac-niel, Mac-lane, Mac-intosh, John Mydyart, Mac-kay, Mac-kenzie*, and many others: but by the names of some of the above, there seem to have been continental as well as insular male-

contents. He examined the titles of their holdings; and finding several to have been usurped, re-mitted their lands to the crown. In the same voyage he had the glory of causing a survey to be taken of the coasts of Scotland, and of the islands, by his pilot Alexander Lindesey; which were published in 1583, at Paris, by Nicholas de Nicholas, geographer to the French monarch.

"The troubles that succeeded the death of James occasioned a neglect of these insulated parts of the Scottish dominions, and left them in a state of anarchy. In 1614, the Mac-donalds made a formidable insurrection, oppugning the royal grant of Cantyre to the earl of Argyle and his relations. The petty chieftains continued in a sort of rebellion; and the sword of the greater, as usual in weak government, was employed against them: the encouragement and protection given by them to pirates, employed the power of the Campbells during the reign of James VI. and the beginning of that of Charles I. (A).

"But the turbulent spirit of the old times continued even to the present age. The heads of Clans were by the divisions, and a false policy that predominated in Scotland during the reign of William III. flattered with an unreal importance: instead of being treated as bad subjects, they were courted as desirable allies: instead of feeling the hand of power, money was allowed to bribe them into the loyalty of the times. They would have accepted the subsidies, notwithstanding they detested the prince that offered them. They were taught to believe themselves of such consequence, that in these days turned to their destruction. Two recent rebellions gave legislature a late experience of the folly of permitting the feudal system to exist in any part of its dominions. The act of 1748, for abolishing heretable jurisdictions, at once deprived the chieftains of all power of injuring the public by their commotions. Many of these *Reguli* second this effort of legislature, and neglect no opportunity of rendering themselves hateful to their unhappy vassals, the former instruments of their ambition."

"The situation of these islands in the great Atlantic ocean renders the air cold and moist in the greater part of them. In the most northerly isles the sun, at the summer solstice, is not above an hour under the horizon at midnight, and not longer above it at mid-day in the depth of winter. The soil of the Hebrides varies also in different isles, and in different parts of the same island: some are mountainous and barren, producing little else than heath, wild myrtle, fern, and a little grass; while others, being cultivated and manured with sea-weed, yield plentiful crops of oats and barley.

"Lead mines have been discovered in some of these islands, but not worked to much advantage; the people being unskilful, and fuel extremely scarce: others have been found to contain quarries of marble, limestone, and free-stone; and many are deluged with iron, talc, crystals, and many curious pebbles, some of which emulate the Brazilian topaz.

"With respect to vegetables, over and above the plentiful harvests of corn that the natives earn from

(A) In the beginning of the last century the islanders were continually harassing Ireland with their plundering incursions, or landing there to support rebellions: at length it was made treason to receive these Hebridian Redshanks, as they were styled.

Hebrides.

agriculture, and the pot-herb and roots that are planted in gardens for the sustenance of the people, these islands produce spontaneously a variety of plants and simples, used by the islanders in the cure of their diseases; but there is hardly a shrub or tree to be seen, except in a very few spots, where some gentlemen have endeavoured to rear them with much more trouble than success.

"The animals, both of the land and sea, domestic and wild, quadrupeds, fowls, and fishes, found in and about these islands, are of the same species, size, and configuration, with those of the ORKNEYS.

"The people inhabiting these islands are of the same race with those who live in the Highlands of Scotland; speak the same language, wear the same habit, and observe the same customs. [See the article HIGHLANDS.]

"The commodities which may be deemed the staples of this country, are black cattle, sheep, and fish, which they sell to their fellow-subjects of Scotland. Part of the wool they work up into knit-stockings, coarse cloth, and that variegated stuff called *tartan*. They likewise salt mutton in the hide, and export it in boats, or barklings, to different parts of the main land. Cod, ling, mackerel, whiting, haddock, and soles, are here caught in abundance, together with a small red cod, remarkably voracious, of a very delicate flavour: there are likewise two kinds of white fish, which seem to be peculiar to this coast, known by the names of *lithe* and *cea*, esteemed good eating: but the greatest treasure the ocean pours forth, is the prodigious quantity of herrings, which, at one season of the year, swarm in all the creeks and bays along the western shore of Scotland. These are counted the largest, fattest, and finest herrings caught in any part of the northern seas. This fishery employs a great number of hands, and brings a considerable advantage to the kingdom. The fish are caught, cured, barrelled up, and exported: but whether from want of skill, or a proper salt for pickling, the Scotch-cured herrings of this coast, though superior to all others in their natural state, are counted inferior to those which are dressed and pickled by the Dutch fishermen.

"How mean and contracted soever the commerce and produce of these islands may be at present, they are, perhaps, more capable of improvement, in both articles, than any part of the British dominions in Europe. The inhabitants are so little skilled in husbandry, that the soil, though generally good in the low grounds, yields nothing but scanty crops of oats and barley; and great tracts of land lie altogether uncultivated. If a very small number of judicious farmers would settle in some of the most considerable islands, they would soon raise such harvests as would enrich themselves; employ and maintain all the idle people, a great number of whom are obliged to repair to foreign countries for subsistence; afford sufficient bread for the inhabitants, and even supply the barren parts of the opposite continent. The soil, in many places, would produce wheat, and in almost every where would give good pasturage, inasmuch that, with proper culture, the people might provide hay and fodder for their cattle, which, during the severity of the winter, die in great numbers for want of provision. Improvements of this

Hebrides.

kind would be the more easily made, as the sea-shore abounds with shells for lime, and sea weeds for manure; and the labourers would be easily subsisted by the fish that swarm, not only in the ocean which surrounds these islands, but likewise in the numerous lakes and rivers of fresh water. Martin declares, that he knew 100 families in this country maintained by as many little farms, the rent of each not exceeding 5 s. one sheep, and a few pecks of oats.

"The commerce of these islands might be extended in such a manner as to render them a staple of trade, and an excellent nursery for seamen. They are furnished with an infinite number of bays, creeks, and harbours, for the convenience of navigation: the inhabitants are numerous, strong, active, and every way qualified for the life of a mariner. The sea affords myriads of fish for exportation: the lands might afford plenty of pasturage for black cattle, horses, and sheep, as well as plenteous harvests of corn, and other grain: woollen and linen manufactures might be prosecuted to great advantage, where labour is cheap and provisions are reasonable. The islands afford good stone and lime; and some parts of the opposite main land, timber for building: they have plenty of fuel, not only for the ordinary purposes of life, but also for salt-pans, which might be erected on different parts of the coast; and for burning sea-ware for the use of a glass or soap manufacture. Finally, the situation of these islands is so commodious for trade, that the navigator is immediately in the open sea, and almost in the neighbourhood of Denmark, Sweden, Hamburg, Holland; nay, with a favourable wind, he can reach the coasts of France and Spain in a week's sailing; if he is bound for the British plantations, or indeed for any part of the known globe, he is at once disencumbered of the land, and prosecutes his voyage thro' the open sea without obstruction or difficulty."

New Hebrides, a cluster of islands lying in the Great South Sea, or Pacific Ocean. The northern islands of this archipelago were first discovered by that great navigator Quiros in 1606, and, not without reason, considered as a part of the southern continent, which at that time, and till very lately, was supposed to exist. They were next visited by M. de Bougainville in 1768, who, besides landing on the island of Lepers, did no more than discover that the land was not connected, but composed of islands, which he called the *Great Cyclades*. Captain Cook, besides ascertaining the extent and situation of these islands, added the knowledge of several in this group which were before unknown: he explored the whole cluster; and thinking himself thereby entitled to affix to them a general appellation, he named them the *New Hebrides*. They are situated between latitudes of 14 deg. 25 min. and 20 deg. 4 min. south; and between 166 deg. 41 min. and 170 deg. 21 min. east longitude; and extend one hundred and twenty-five leagues in the direction of north-north-west, and south-south-east. The most northern part of this archipelago was called by M. de Bougainville the *Peak of the Etioile*. The whole cluster consists of the following islands; some of which have received names from the different European navigators; others retain the names which they bear

Hebron
||
Hecatomb-
polis.

bear among the natives, viz. Tierra del Esperitu Santo, Mallicollo, St Bartholomew, Isle of Lepers, Aurora, Whitfuntide, Ambrym, Immer, Apee, Three Hills, Sandwich, Montagu, Hinchinbrook, Shepherd, Eoramanga, Ironan, Annatom, and Tanna.

HEBRON (anc. geog.), a very ancient city situated in the hilly country of the tribe of Judah to the south. Its more ancient name was *Kiriath Arba*, or *Cariath Arba*. In antiquity this city vied with the most ancient cities of Egypt, being seven years prior to Zoan, translated *Tanis* by the seventy. Josephus makes it not only older than Tanis, but even than Memphis. It stood to the west of the lake Asphaltites, and was for some time the royal residence of David. After the captivity, it fell into the hands of the Edomites, as did all the fourth country of Judaea.

HECATE, in Pagan worship, a goddess called *Luna* in heaven, *Diana* on earth, and *Hecate* in the infernal regions. But others represent her as a distinct deity. She was the goddess of the infernal regions, and of inevitable fate. She presided over streets and highways, for which reason she was called *Tricia*; and the doors of houses being under her protection, she was called *Proptylea*. She was also famous for her skill in poisonous roots and herbs, incantments, and magical arts, in the practice of which her name was constantly invoked.

HECATOMB, HECATOMBE, in antiquity, a sacrifice of 100 beasts of the same kind, at 100 altars, and by 100 priests or sacrificers.—The word is formed of the Greek *εκατομβη* which properly signifies a sumptuous or magnificent sacrifice.—Others derive it from the Greek *εκατον, centum*, “a hundred, and *εως, bos*, “bullock,” &c.; on which footing the hecatomb should be a sacrifice of 100 bullocks.—Others derive the word from *εκατον, and πους, pes*, “foot;” and on that principle hold, that the hecatomb might consist of only 25 four-footed beasts. They add, that it did not matter what kind of beasts were chose for victims, provided the quota of feet were but had.

Pythagoras is said to have sacrificed a hecatomb to the muses, of 100 oxen, in joy and gratitude for his discovering the demonstration of the 47th proposition of the first book of Euclid, viz. that, in a rectangled triangle, the square of the hypothenuse is equal to the squares of the two other sides.

For the origin of hecatombs: Strabo relates, that there were 100 cities in Laconia, and that each city used to sacrifice a bullock every year for the common safety of the country; whence the institution of the celebrated sacrifice of 100 victims, called *hecatombs*. Others refer the origin of hecatombs to a plague, where-with the 100 cities of Peloponnesus were afflicted; for the removal whereof, they jointly contributed to so splendid a sacrifice.

Julius Capitolinus relates, that for a hecatomb they erected 100 altars of turf, and on these sacrificed 100 sheep, and 100 hogs. He adds, that when the emperors offered sacrifices of this kind, they sacrificed 100 lions, 100 eagles, and 100 other beasts of the like kind.

HECATOMPOLIS, (anc. geog.), a surname of the island of Crete, from its 100 cities. The territory of Laconia also had anciently this name, for the same reason; and the custom of these 100 cities was to fa-

crifice a hecatomb annually.

HECATOMPYLOS, (anc. geog.) the metropolis of Parthia, and royal residence of Arsaces, situated at the springs of the Araxes. Thebes, in Egypt, had also the same name, from its 100 gates.

HECK, an engine to take fish. A salmon heck is a grate for catching that sort of fish.

HECTIC FEVER. See (the *Index* subjoined to) MEDICINE.

HECTOR, the son of Priam and Hecuba, and the father of Altyanax, is celebrated for the valour with which he defended the city of Troy against the Greeks. He was killed by Achilles, who dragged his body, fastened to his chariot, thrice round the walls of Troy, and afterwards restored it to Priam for a large ransom. See *Troy*.

HERERA, Ivy, in botany, a genus of the monogynia order, belonging to the pentandria class of plants.

Species. 1. The helix, or common ivy, grows naturally in many parts of Britain; and, where it meets with any support, will rise to a great height, sending out roots on every side, which strike into the joints of walls or the bark of trees. If there is no support, they trail on the ground, and take root all their length, so that they closely cover the surface, and are difficult to eradicate. While these stalks are fixed to any support, or trail upon the ground, they are slender and flexible; but when they have reached to the top of their support, they shorten and become woody, forming themselves into large bushy heads, and their leaves are larger, more of an oval shape, and not divided into lobes like the lower leaves, so that it hath a quite different appearance. There are two varieties of this species, one with silver-striped leaves, the other with yellowish leaves on the top of the branches; and these are sometimes admitted into gardens. 2. The quinquifolia, or Virginia creeper, is a native of all the northern parts of America. It was first brought to Europe from Canada; and has been long cultivated in the British gardens, chiefly to plant against walls or buildings to cover them: which these plants will do in a short time; for they will shoot almost 20 feet in one year, and will mount up to the top of the highest building: but as the leaves fall off in autumn, the plants make but an indifferent appearance in winter, and therefore are proper only for such situations as will not admit of better plants; for this will thrive in the midst of cities, and is not injured by smoke or the closeness of the air.

Culture. The first species is easily propagated by its trailing branches, and will thrive in almost any soil or situation. The second may be propagated by cuttings; which if planted in autumn in a shady border will take root, and by the following autumn will be fit to plant in those places where they are designed to remain.

Uses. The roots of the ivy are used by leather-cutters to whet their knives upon. Apricots and peaches covered with ivy during the month of February, have been observed to bear fruit plentifully. The leaves have a nauseous taste; Haller says, they are given to children in Germany as a specific for the atrophy. The common people of England apply them to issues; and an ointment made from them is in great esteem among the

Hecatomb-
pylos
||
Hedera.

*Hederaceæ,
Hedges.*

the Highlanders of Scotland as a ready cure for burns. The berries have a little acidity. When fully ripe, a dose of them has been recommended in the plague. In warm climates, a refinous juice exudes from the stalks, which is said to be a powerful resolvent and discutient, and an excellent ingredient in plasters and ointments adopted for those purposes. Horses and sheep eat the plant; goats and cows refuse it.—Cæsar Baubine and Tournefort mention a sort of ivy that grows in many of the islands of the Archipelago, to which they have given the name of the *poet's ivy*, because the ancients are said to have made crowns of this plant for adorning the brows of their poets. By others it is called *hedera dionysia*, because they made use of the same sort of ivy in their public rejoicings and feasts in honour of Bacchus. The berries are of a fine gold colour, whence this species has been termed by others *chrysocarpus*.

HEDERACEÆ, (from *hedera* “ivy.”) The name of the 46th order in Linnæus’s fragments of a natural method, consisting of ivy, and a few other genera nearly from their general habit and appearance seem nearly allied to it. See BOTANY, p. 1315.

HEDGES, in agriculture, are either planted to make fences round inclosures, or to divide the several parts of a garden. When they are designed as outward fences, they are planted either with hawthorn, crabs, or black-thorn; but those hedges which are planted in gardens, either to surround wilderness-quarters, or to screen the other parts of a garden from sight, are planted according to the fancy of the owner; some preferring ever-greens, in which case the holly is best; next the yew, then the laurel, laurustinus, phillyrea, &c. Others prefer the beech, the hornbeam, and the elm.

Before planting, it is proper to consider the nature of the land, and what sort of plants will thrive best in it; and also, what is the soil from whence the plants are to be taken. As for the size, the sets ought to be about the thickness of one’s little finger, and cut within about four or five inches of the ground; they ought to be fresh taken up, straight, smooth, and well rooted. Those plants that are raised in the nursery, are to be preferred.

In planting outside hedges, the turf is to be laid, with the grass-side downwards, on that side of the ditch the bank is designed to be made; and some of the best mould should be laid upon it to bed the quick, which is to be set upon it a foot asunder. When the first row of quick is set, it must be covered with mould; and when the bank is a foot high, you may lay another row of sets against the spaces of the former, and cover them as you did the others: the bank is then to be topped with the bottom of the ditch, and a dry or dead-hedge laid, to shade and defend the under-plantation. Stakes should then be driven into the loose earth, so low as to reach the firm ground: these are to be placed at about two feet and a half distance: and in order to render the hedge yet stronger, you may edder it, that is, bind the top of the stakes with small long poles, and when the eddering is finished, drive the stakes anew.

The quick must be kept constantly weeded, and secured from being cropped by cattle; and in February it will be proper to cut it within an inch of the ground, which will cause it strike root afresh, and help it much

in the growth.

The crab is frequently planted for hedges; and if the plants are raised from the kernels of the small wild crabs, they are much to be preferred to those raised from the kernels of all sorts of apples without distinction; because the plants of the true small crab never shoot so strong as those of the apples, and may therefore be better kept within the proper compals of an hedge.

The black-thorn, or sloe, is frequently planted for hedges: and the best method of doing it, is to raise the plants from the stones of the fruit, which should be sown about the middle of January, if the weather will permit, in the place where the hedge is intended; but when they are kept longer out of the ground, it will be proper to mix them with sand, and keep them in a cool place. The same fence will do for it when sown, as when it is planted.

The holly is sometimes planted for hedges; but where it is exposed, there will be great difficulty in preventing its being destroyed: otherwise, it is by far the most beautiful plant; and, being an ever-green, will afford much better shelter for cattle in winter than any other sort of hedge. The best method of raising these hedges, is to sow the stones in the place where the hedge is intended; and, where this can be conveniently done, the plants will make a much better progress than those that are transplanted: but these berries should be buried in the ground several months before they are sown. The way to do this, is to gather the berries about Christmas, when they are usually ripe, and put them into large flower-pots, mixing some sand with them; then dig holes in the ground, into which the pots must be sunk, covering them over with earth, about ten inches thick. In this place they must remain till the following October, when they should be taken up, and sown in the place where the hedge is intended to be made. The ground should be well trenched, and cleared from the roots of all bad weeds, bushes, trees, &c. Then two drills should be made, at about a foot distance from each other, and about two inches deep, into which the seeds should be scattered pretty close, lest some should fail. When the plants grow up, they must be carefully weeded: and if they are designed to be kept very neat, they should be cut twice a year, that is in May and in August; but if they are only designed for fences, they need only be sheered in July. The fences for these hedges, while young, should admit as much free air as possible: the best sort are those made with posts and rails, or with ropes drawn through holes made in the posts; and if the ropes are painted over with a composition of melted pitch, brown Spanish colour and oil, well mixed, they will last several years.

Hedges for ornament in gardens are sometimes planted with ever-greens, in which case the holly is preferable to any other: next to this, most people prefer the yew; but the dead colour of its leaves renders those hedges less agreeable. The laurel is one of the most beautiful ever-greens; but the shoots are so luxuriant that it is difficult to keep it in any tolerable shape; and as the leaves are large, to prevent the disagreeable appearance given them by their being cut through with the sheers, it will be the best way to prune them with a knife, cutting the shoots just down to a leaf. The laurustinus is a very fine plant

Hedges.

Hedges.

plant for this purpose; but the same objection may be made to this as to the laurel: this, therefore, ought only to be pruned with a knife in April, when the flowers are going off; but the new shoots of the same spring fruit by no means be shortened. The small-leaved and rough-leaved *laurulus* are the best plants for this purpose. The true *phillyrea* is the next best plant for hedges, which may be led up to the height of 10 or 12 feet; and if they are kept narrow at the top, that there may be not too much width for the snow to lodge upon them, they will be close and thick, and make a fine appearance. The *ilex*, or ever-green oak, is also planted for hedges, and is a fit plant for those designed to grow very tall.—The deciduous plants usually planted to form hedges in gardens are, The hornbeam, which may be kept neat with less trouble than most other plants. The beech, which has the same good qualities as the hornbeam; but the gradual falling of its leaves in winter causes a continual litter. The small-leaved English elm is a proper tree for tall hedges, but these should not be planted closer than eight or ten feet. The lime-tree has also been recommended for the same purpose; but after they have stood some years, they grow very thin at bottom, and their leaves frequently turn of a black disagreeable colour.

Many of the flowering shrubs have also been planted in hedges, such as roses, honeysuckles, sweet-briar, &c. but these are difficult to train; and if they are cut to bring them within compass, their flowers, which are their greatest beauty, will be entirely destroyed.

Mr Anderson who hath treated the subject of hedging very particularly, is of opinion, that some other plants besides those abovementioned, might be usefully employed in the construction of hedges. Among these he reckons the common willow. This, he says, by no means requires the wetness of soil which is commonly supposed. "It is generally imagined, (says he,) that the willow can be made to thrive no where except in wet or boggy ground: but this is one of those vulgar errors, founded upon inaccurate observation, too often to be met with in subjects relating to rural affairs; for, experience has sufficiently convinced me, that this plant will not only grow, but thrive, in any rich well-cultivated soil, (unless in particular circumstances that need not here be mentioned), even altho' it be of a very dry nature. It could not, however, in general, be made to thrive, if planted in the same manner as thorns; nor would it, in any respect, be proper to train it up for a fence in the same way as that plant. The willow, as a fence, could seldom be successfully employed, but for dividing into separate inclosures any extensive field of rich ground: and, as it is always necessary to put the soil into as good order as possible before a hedge of this kind is planted in it, the easiest method of putting it into the necessary high tilth, will be to mark off the boundaries of your several fields in the winter, or early in the spring, with a design to give a complete fallow to a narrow ridge, six or eight feet broad, in the middle of which the hedge is intended to be planted the ensuing winter. This ridge ought to be frequently ploughed during the summer-season, and in autumn to be well manured with dung, or lime, or both, (for it cannot be made too rich) and be neatly formed into a ridge before winter.

Hedges.

"Having prepared the ground in this manner, it will be in readiness to receive the hedge, which ought to be planted as early in winter as can be got conveniently done; as the willow is much hurt by being planted late in the spring. But before you begin to make a fence of this kind, it will be necessary to provide a sufficient number of plants: which will be best done by previously rearing them in a nursery of your own, as near the field to be inclosed as you can conveniently have it; for, as they are very bulky, the carriage of them would be troublesome if they were brought from any considerable distance. The best kinds of willow for this use, are such as make the longest and strongest shoots, and are not of a brittle nature. All the large kinds of hoop-willows may be employed for this use; but there is another kind with stronger and more taper shoots, covered with a dark green bark when young, which, upon the older shoots, becomes of an ash-gray, of a firm texture, and a little rough to the touch. The leaves are not so long, and a great deal broader than those of the common hoop-willow, pretty thick, and of a dark-green colour. What name this species is usually known by, I cannot tell; but, as it becomes very quickly of a large size at the root, and is strong and firm, it ought to be made choice of for this purpose in preference to all other kinds that I have seen. The shoots ought to be of two or three years growth before they can be properly used, and should never be less than eight or nine feet in length. These ought to be cut over close by the ground immediately before planting, and carried to the field at their whole length. The planter having stretched a line along the middle of the ridge which was prepared for their reception, begins at one end thereof, thrusting a row of these plants firmly into the ground, close by the side of the line, at the distance of 18 or 20 inches from one another; making them all slant a little to one side in a direction parallel to the line. This being finished, let him begin at the opposite end of the line, and plant another row in the intervals between the plants of the former row; making these incline as much as the others, but in a direction exactly contrary; and then, plaiting these basket-ways, work them into lozenges like a net, fastening the tops by plaiting the small twigs with one another, which with very little trouble may be made to bind together very firmly. The whole, when finished, assumes a very beautiful net-like appearance, and is even at first a tolerable good defence: and, as these plants immediately take root and quickly increase in size, it becomes, after a few years, a very strong fence which nothing can penetrate. This kind of hedge I myself have employed; and find that a man may plant and twist properly about a hundred yards in a day, if the plants be laid down to his hand: and, in a situation such as I have described, I know no kind of fence which could be reared at such a small expence, so quickly become a defence, and continue so long in good order. But it will be greatly improved by putting a plant of *eglantine* between each two plants of willow, which will quickly climb up and be supported by them; and, by its numerous prickles would effectually preserve the defenceless willow from being browsed upon by cattle.

"As it will be necessary to keep the narrow ridge, upon..

Hedges.

upon which the hedge is planted in culture for one year at least, that the plants of eglantine may not be choked by weeds, and that the roots of the willow may be allowed to spread with the greater ease in the tender mold produced by this means, it will be proper to stir the earth once or twice by a gentle horse-hoe in the beginning of summer; and, in the month of June, it may be sowed with turnips, or planted with coleworts, which will abundantly repay the expence of the fallow."

The same author also gives the following useful directions for planting hedges in situations very much exposed to the weather, and recovering them when on the point of decaying. "Those who live in an open uncultivated country, have many difficulties to encounter, which others who inhabit more warm and sheltered regions never experience; and, among these difficulties, may be reckoned that of hardly getting hedges to grow with facility. For, where a young hedge is much exposed to violent and continued gusts of wind, no art will ever make it rise with so much freedom, or grow with such luxuriance, as it would do in a more sheltered situation and favourable exposure.

"But, although it is impossible to rear hedges, in this situation, to so much perfection as in the others, yet they may be reared even there, with a little attention and pains, so as to become very fine fences.

"It is advisable, in all cases, to plant the hedges upon the face of a bank; but it becomes absolutely necessary in such an exposed situation as that I have now described: for the bank, by breaking the force of the wind, screens the young hedge from the violence of the blast, and allows it to advance, for some time at first, with much greater luxuriance than it otherwise could have done.

"But, as it may be expected soon to grow as high as the bank, it behoves the provident husbandman to prepare for that event, and guard, with a wise foresight, against the inconvenience that may be expected to arise from that circumstance.

"With this view, it will be proper for him, instead of making a single ditch, and planting one hedge, to raise a pretty high bank, with a ditch on each side of it, and a hedge on each face of the bank; in which situation, the bank will equally shelter each of the two hedges, while they are lower than it; and, when they at length become as high as the bank, the one hedge will in a manner afford shelter to the other, so as to enable them to advance with much greater luxuriance than either of them would have done singly.

"To effectuate this still more perfectly, let a row of service-trees be planted along the top of the bank, at the distance of 18 inches from each other, with a plant of eglantine between each two services. This plant will advance, in some degree, even in this exposed situation; and, by its numerous shoots, covered with large leaves, will effectually screen the hedge on each side of it, which, in its turn, will receive some support and shelter from them, so that they will be enabled to advance all together, and form, in time, a close, strong, and beautiful fence.

"The *service* is a tree but little known in Scotland; although it is one of those that ought perhaps to be often cultivated there in preference to any other tree whatever, as it is more hardy, and, in an exposed situ-

ation, affords more shelter to other plants than almost any other tree I know: for it sends out a great many strong branches from the under part of the stem, which, in time, assume an upright direction, and continue to advance with vigour, and carry many leaves to the very bottom, almost as long as the tree exists; so that, if it is not pruned, it rises a large cloe bush, till it attains the height of a forest-tree.

"It is of the same genus with the rawn-tree—and has a great resemblance to it both in flower and fruit; its branches are more waving and pliant—its leaves undivided, broad and round, somewhat resembling the elm, but white and mealy on the under side. It deserves to be better known than it is at present.

"But if, from the poorness of the soil in which your hedge is planted, or from any other cause, it should so happen, that, after a few years, the hedge becomes sickly, and the plants turn poor and stunted in appearance, the easiest and only effectual remedy for that disease, is to cut the stems of the plants clean over, at the height of an inch or two above the ground; after which they will send forth much stronger shoots than they ever would have done without this operation. And, if the hedge be kept free of weeds, and trained afterwards in the manner above described, it will, in almost every case, be recovered, and rendered fresh and vigorous.

"This amputation ought to be performed in autumn, or the beginning of winter; and, in the spring, when the young buds begin to show themselves, the stumps ought to be examined with care, and all the buds be rubbed off, excepting one or two of the strongest and best placed, which should be left for a stem. For, if the numerous buds that spring forth round the stem are allowed to spring up undisturbed, they will become in a few years as weak and stunted as before; and the hedge will never afterwards be able to attain any considerable height, strength, or healthfulness.—I have seen many hedges, that have been repeatedly cut over, totally ruined by this circumstance not having been attended to in proper time.

"If the ground for 16 or 20 feet on each side of the hedge be fallowed at the time that this operation is performed, and get a thorough dressing with rich manures, and be kept in high order for some years afterwards by good culture and meliorating crops, the hedge will prosper much better than if this had been omitted, especially if it has been planted on the level ground, or on the bank of a shallow ditch.

"It sometimes happens, that a hedge may have been long neglected, and be in general in a healthy state, but full of gaps and openings, or so thin and straggling, as to form but a very imperfect sort of fence. On these occasions, it is in vain to hope to fill up the gaps by planting young quicks; for these would always be outgrown, choked, and starved, by the old plants: nor could it be recovered by cutting clear over by the roots, as the gaps would still continue where they formerly were. The only methods that I know of rendering this a fence are, either to mend up the gaps with dead wood, or to *plash* the hedge; which last operation is always the most eligible, where the gaps are not too large to admit of being cured by this means.

"The operation I here call *plashing*, may be defined,

Hedges.

fined, "a wattling made of living wood." To form this, some stems are first selected, to be left as stakes at proper distances, the tops of which are all cut over at the height of four feet from the root. The straggling side-branches of the other part of the hedge are also lopped away. Several of the remaining plants are then cut over, close by the ground, at convenient distances; and the remaining plants are cut perhaps half through, so as to permit them to be bent to one side. They are then bent down almost to a horizontal position, and interwoven with the upright stakes, so as to retain them in that position. Care ought to be taken, that these be laid very low, at those places where there were formerly gaps; which ought to be farther strengthened by some dead stakes or truncheons of willows, which will frequently take root in this case, and continue to live. And sometimes a plant of egantine will be able to overcome the difficulties it there meets with, strike root, and grow up so as to strengthen the hedge in a most effectual manner.

"The operator begins at one end of the field, and proceeds regularly forward, bending all the stems in one direction, so that the points rise above the roots of the others, till the whole wattling is completed to the same height as the uprights.

"An expert operator will perform this work with much greater expedition, than one who has not seen it done could easily imagine. And, as all the diagonal wattlings continue to live and send out shoots from many parts of their stems, and as the upright shoots that rise from the stumps of those plants that have been cut over quickly rush up through the whole hedge, these serve to unite the whole into one entire mass, that forms a strong, durable, and beautiful fence.

"This is the best method, of recovering an old neglected hedge, that hath as yet come to my knowledge.

"In some cases it happens that the young shoots of a hedge are killed every winter; in which case it soon becomes dead and unsightly, and can never rise to any considerable height. A remedy for this disease may therefore be wished for.

"Young hedges are observed to be chiefly affected with this disorder; and it is almost always occasioned by an injudicious management of the hedge, by means of which it has been forced to send out too great a number of shoots in summer, that are thus rendered so small and weakly as to be unable to resist the severe weather in winter.

It often happens that the owner of a young hedge, with a view to render it very thick and close, cuts it over with the shears a few inches above the ground the first winter after planting; in consequence of which, many small shoots spring out from each of the stems that has been cut over.—Each of which, being afterwards cut over in the same manner, sends forth a still greater number of shoots, which are smaller and smaller in proportion to their number.

"If the soil in which the hedge has been planted is poor, in consequence of this management, the branches, after a few years, become so numerous, that the hedge is unable to send out any shoots at all, and the utmost exertion of the vegetative powers enables it only to put forth leaves. These leaves are renewed in a sickly state for some years, and at last cease to grow at all—the dry-stems become covered with fog, and the hedge

perishes entirely.

"But if the soil be very rich, notwithstanding this great multiplication of the stems, the roots will still have sufficient vigour to force out a great many small shoots, which advance to a great length, but never attain a proportional thickness. And, as the vigour of the hedge makes them continue to vegetate very late in autumn, the frosts come on before the tops of these dangling shoots have attained any degree of woody firmness, so that they are killed almost entirely by it; the whole hedge becomes covered with these long dead shoots, which are always disagreeable to look at, and usually indicate the approaching end of the hedge.

"The causes of the disorder being thus explained, it will readily occur, that the only radical cure is amputation; which, by giving an opportunity to begin with training the hedge anew, gives us also an opportunity of avoiding the errors that occasioned it. In this case, care ought to be taken to cut the plants as close to the ground as possible, as there the stems will be less numerous than at any greater height. And particular attention ought to be had to allow very few shoots to arise from the stems that have been cut over, and to guard carefully against shortening them.

"But as the roots, in the case here supposed, will be very strong, the shoots that are allowed to spring from the stems will be very vigorous, and there will be some danger of their continuing to grow later in the season than they ought in safety to do; in which case, some part of the top of the shoot may perhaps be killed the first winter, which ought if possible to be prevented. This can only be effectually done by giving a check to the vegetation in autumn, so as to allow the young shoots to harden in the points before the winter approaches. If any of the leaves or branches of a tree are cut away while it is in the state of vegetation, the whole plant feels the loss, and it suffers a temporary check in its growth in proportion to the loss that it thus sustains. To check, therefore, the vigorous vegetation at the end of autumn, it will be prudent to choose the beginning of September for the time of lopping off all the supernumerary branches from the young hedge, and for clipping off the side-branches that have sprung out from it; which will, in general, be sufficient to give it such a check in its growth at that season, as will prevent any of the shoots from advancing afterwards. If the hedge is extremely vigorous, a few buds may be allowed to grow upon the large stumps in the spring, with a view to be cut off at this season, which will tend to stop the vegetation of the hedge still more effectually.

"By this mode of management, the hedge may be preserved entire through the first winter. And, as the shoots become less vigorous every successive season, there will be less difficulty in preserving them at any future period. It will always be proper, however, to trim the sides of a very vigorous hedge for some years while it is young, about the same season of the year, which will tend powerfully to prevent this malady. But when the hedge has advanced to any considerable height, it will be equally proper to clip it during any of the winter-months, before Candlemas."

HEDGE-HOG. See ERINACEUS.

HEDYSARUM, in botany, a genus of the decandria order, belonging to the diadelphia class

of plants. There are 49 species of this plant, of which the most remarkable are, 1. The movens, or moving plant, a native of the East Indies, where it is called *burrum chundalli*. The seeds of it were sent to Edinburgh by Mr Kerr, and the plant is now growing in the botanical garden there. It arrives at the height of four feet, and in autumn produces bunches of yellow flowers. The root is annual or biennial. It is a trifolious plant, and the lateral leaves are smaller than those at the end, and all day long they are in constant motion without any external impulse. They move up and down and circularly. This last motion is performed by the twisting of the footstalks; and while the one leaf is rising, its associate is generally descending. The motion downwards is quicker and more irregular than the motion upwards, which is steady and uniform. These motions are observable for the space of 24 hours in the leaves of a branch which is lopped off from the shrub if it is kept in water. If from any obstacle the motion is retarded, upon the removal of that obstacle it is resumed with a greater degree of velocity. This species was unknown to Linnæus.—2. The coronarium, or common biennial French honeysuckle, hath large deeply-striking biennial roots; upright, hollow, smooth, very branchy stalks, three or four feet high, garnished with pinnated leaves; and from the places of the leaves proceed long spikes of beautiful red flowers, succeeded by jointed seed-pods.

Culture. The first species being a native of hot climates, requires the common culture of tender exotics; the second is easily raised from seed in any of the common borders, and is very ornamental.

HEEL, in anatomy. See there, n° 65.

HEEL of a Horse, the lower hinder-part of the foot comprehended between the quarters and opposite to the toe. The heel of a horse should be high and large, and one side of it should not rise higher than the other upon the pattern. To recover the heels of a horse that is hoof-bound, you should take out his sole and keep his heels very wide, by which they will be restored in a month.

HEEL of a Horseman. This being the part that is armed with the spur, the word is used for the spur itself; as, "This horse understands the heel well." To ride a horse from one heel to another, is to make him go sideways, sometimes to one heel and sometimes to another.

HEEL, in the sea-language. If a ship leans on one side, whether she be a-ground or a-float, then it is said she heels a-starboard, or a-port; or that she heels off-wards, or to the shore; that is, inclines more to one side than to another.

HEELER, or Bloody-HEEL-Cock, a fighting cock, that strikes or wounds much with his spurs.

The masters know such a cock, even while a chicken, by the striking of his two heels together in his going.

HEEM, (John David,) an able painter, born at Utrecht in 1604. He excelled in painting flowers, fruit, vases, and instruments of music, which he performed in such a perfect manner, that a person was apt to attempt taking them in his hand. His colouring is agreeable, and the insects in his pictures appear alive. He died at Antwerp in 1674.

Cornelius de HEEM, his son, was also a good paint-

er, though inferior to his father.

HEEMSKIRK. See HEMSKIRK.

HEGIRA, in chronology, a celebrated epocha among the Mahometans.

The event which gave rise to this epocha was the flight of Mahomet from Mecca, with his new profelytes, to avoid the persecution of the Coraichites; who, being then most powerful in the city, could not bear that Mahomet should abolish idolatry, and establish his new religion. This flight happened in the fourteenth year after Mahomet had commenced prophet: he retired to Medina, which he made the place of his residence. See ARABIA, n° 44.

HEIDENHEIM, a town of Germany, in Swabia, and in the territory of Brentzhall, with a handsome palace or castle, belonging to the house of Wirtemberg. E. Long. 10. 19. N. Lat. 48. 37.

HEIDLEBERG, a considerable and populous town of Germany, capital of the Lower Palatinate, with a celebrated university. It is noted for its great ton, which holds 800 hogheads, generally kept full of good Rhenish wine. It stands in a pleasant rich country, and was a famous seat of learning: but it has undergone so many calamities, that it is nothing now to what it was formerly. It was first reduced to a heap of ruins in 1622, by the Spaniards; and the rich library was transported partly to Vienna, and partly to the Vatican at Rome. After this it enjoyed the benefits of peace, till the Protestant electoral house became extinct, and a bloody war ensued, in which not only the castle was ruined, but the tombs and bodies of the electors were shamefully violated and pillaged. This happened in 1693; and the people of the Palatinate were obliged to leave their dwellings, and to go for refuge into foreign countries. To add to these misfortunes, the elector resided at Mannheim, and carried most of the people of distinction along with him, so that it is uncertain whether Heidelberg will ever recover itself or not, though they have begun to rebuild some of the fortifications. The great ton was broke to pieces in 1693 by the French, and at great expence in 1729 was repaired. The town stands on the river Neckar, over which there is a handsome bridge. E. Long. 8. 48. N. Lat. 49. 25.

HEIGHT, in general, signifies the difference between the ground and the top of any object measured perpendicularly.

Methods of measuring HEIGHTS. See GEOMETRY, TRIGONOMETRY, BAROMETER, MOUNTAIN, and (BAROMETER in the APPENDIX.)

HEILA, a town of Royal Prussia, in Cassubia, seated at the mouth of the river Vistula, on the Baltic Sea, and subject to Poland, 12 miles north of Dantzick. E. Long. 19. 25. N. Lat. 54. 53.

HEILEGEN-HAVE, a sea-port town of Germany, in Lower Saxony, and in Wageria, seated on the Baltic Sea, over-against the island of Termeren. E. Long. 11. 15. E. Lat. 57. 30.

HEINECCIUS (John Gotlieb), one of the greatest civilians of the 18th century, was born at Eisenberg, in the principality of Altenburg, in 1681. After having studied at Gosslar and Leipzick, he was designed for the ministry, and began to preach; but disliking that profession, he laid it aside, and applied himself entirely to the study of philosophy and the civ-

Hinetken,
Heinfius.

vil law. In 1710, he became professor of philosophy at Hall; and in 1721, he was made professor of civil law, with the title of *counsellor of the court*. His great reputation made the states of Friesland invite him to Franeker in 1724; but three years after, the king of Prussia prevailed on him to accept of a professorship of law at Francfort on the Oder, where he distinguished himself till the year 1733. Becoming again professor at Hall, he remained there till his death, which happened in 1741, notwithstanding his being invited to Marburg, Denmark, and three academies in Holland. He wrote many works, all of them much esteemed. The principal are, 1. *Antiquitatum Romanarum jurisprudentiam illustrantium syntagma*. It was this excellent abridgement that gave rise to his reputation in foreign countries. 2. *Elementa juris civilis secundum ordinem institutionum & pandectarum*. 3. *Fundamenti styli cultioris*. There are few works so useful as this for forming a Latin style. 4. *Elementa philosophiæ rationalis & moralis, quibus præmissa historia philosophica*. 5. *Historia juris civilis Romanæ & Germanicæ*. 6. *Elementa juris naturæ & gentium*, &c.

HEINETKEN (Christian), an extraordinary child, the prodigy of the North, was born at Lubeck in 1721. He spoke his maternal tongue fluently at 10 months. At one year old, he knew the principal events of the pentateuch; in two months more, he was master of the entire history of the Old and New Testaments; at two years and an half, he answered the principal questions in geography and in ancient and modern history; and he spoke Latin and French with great facility before the commencement of his fourth year. His constitution was so delicate, that he was not weaned till a few months before his death. M. Martini of Lubeck published a pamphlet in 1730, in which he endeavoured to give natural reasons for the extraordinary capacity of this infant, who died in his fifth year.

HEINSIUS (Daniel), professor of politics and history at Leyden, and librarian to the university there, was born at Gand in Flanders in 1580. He became a scholar to Joseph Scaliger at Leyden, and was indebted to the encouragement and care of that great man, for the perfection to which he attained in literature, and which at the beginning of his life there was little reason to hope from him. He distinguished himself as a critic by his labours on many classical authors; and was highly honoured as well abroad as at home: Gustavus Adolphus king of Sweden gave him a place among his counsellors of state; the republic of Venice made him a knight of the order of St Mark; and pope Urban VIII. made him great offers, if he would come, as he expressed it, "to rescue Rome from barbarism." He died in 1666, leaving several works of his own, both in poetry and prose.

HEINSIUS (Nicholas), the son of Daniel Heinfius, was born at Leyden; and became as great a Latin poet, and a greater critic than his father. His poems have been several times printed, but the best edition is that of Amsterdam in 1666. He gave editions of several of the classics, with notes; his Claudian is dedicated in a Latin poem to queen Christina of Sweden, and his Ovid to Thuanus. At his death, which happened in 1681, he disclaimed all his works, and expressed the utmost regret at having left behind him fo

Heir
||
Helena.

many "monuments of his vanity," as he called them. He was as much distinguished by his great employments in the state, as by his talents, learning, and good qualities.

HEIR, in law, signifies the person who succeeds another by descent to lands, tenements, and hereditaments, being an estate of inheritance, or an estate in fee; because nothing passes by right of inheritance but in fee. See the articles CONSANGUINITY, DESCENT, FEE, SUCCESSION; and LAW, N^o lxxvi. & clxxx. et seq.

HEIR Apparent, is a person so called in the lifetime of his ancestor, at whose death he is heir at law.

HEIRESS, a female heir to one who has an estate in lands, &c. See HEIR.

Stealing an HEIRESS. See FORCIBLE Marriage.

HEIRSHIP MOVEABLES, in Scots law, the best of certain kinds of moveables, which the heir of line is intitled to take, besides the heritable estate. See LAW, N^o clxxx. 7.

HELENA, or St HELENA, an island in the Atlantic Ocean, belonging to the English East India company, and situated in W. Long. 6. 30. S. Lat. 16°. The greatest length of the island is about eight miles, and its circumference about 20. It hath some high mountains, particularly one called *Diana's peak*, which is covered with woods to the very top. Other hills there are which bear evident marks of a volcanic origin; and some have huge rocks of lava, and a kind of half-vitrified flags. The country, according to Mr Förster, has a fine appearance; the soil is in many places a rich mould, from six to ten inches deep, and a variety of plants thrive in it luxuriantly. He found many plants here which he had not observed in other parts of the world. Among these were some called by the natives *cabbage-trees*, *gum-trees*, and *red wood*. The former thrive in moist places; but the latter are always found on the ridges of hills where the soil is dry. The cabbage-tree has rather large leaves; but after many inquiries Mr Förster could not find that it was used for any other purpose than that of fuel, and no reason could be assigned why it had obtained that name. It must not be confounded with the cabbage-tree of America, India, and the South Seas, which is a species of palm.

The island is laid out entirely in gardens and pasturage. Peaches are the only European fruits that thrive here. Cabbages and other greens which thrive extremely well are devoured by caterpillars; and every species of corn is destroyed by rats. All the pastures were over-run with furze; which, though in our country a very useless and even pernicious plant, was of singular advantage to the inhabitants of St Helena. Before the introduction of that plant, the ground was parched by the intense heat, and all kinds of grass and herbage were shrivelled up. But the furze-bushes, which thrive as it were in despite of the sun, preserved a degree of moisture in the ground; by which means the grass sprung up vigorously, and the country became covered with a rich and beautiful sod. The furze is now no longer wanted, and the people assiduously root it out for fuel. The number of people on St Helena does not exceed 2000 persons, including 500 soldiers, and 600 slaves; and it is said that the number of females born on the island considerably exceeds that of the males. By the arrival of the In-

Helena
Helenium.

dia ships which they supply with refreshments, they are in return provided with all sorts of manufactures and other necessities; and the Company annually order one or two of their ships to touch there in their way to India, in order to fend them a sufficient quantity of European goods and provisions. Many of their slaves are employed in catching fish, which are very plentiful; and, by the help of these, together with their poultry, cattle, roots, and salt provisions, they subsist through the year. Their life (says Mr Forster) seems to pass along very happily; free from the multitude of cares which distress their countrymen in England, and blessed with quiet and content.

St Helena was first discovered by the Portuguese in 1502, on St Helen's day; whence its name. They stocked it with different kinds of useful animals; but whether they ever settled a colony on it or not, is uncertain. The Portuguese having either abandoned, or never taken possession of it, the Dutch became its masters; and kept possession of it till the year 1600, when they were driven out by the English. In 1673, the Dutch took it by surprise; but a short time after it was recovered by the brave captain Munden, who also took three Dutch East India men then lying in the harbour. On this occasion the Hollanders had fortified the landing-place, of which there is only one on the island; and erected batteries of great guns to prevent a descent: but the English having knowledge of a small creek, where only two men abreast could creep up, climbed to the top of the rock in the night; and appearing the next morning behind the batteries, the Dutch were so terrified, that they threw down their arms, and surrendered at discretion. This creek has been since fortified, and a battery of large cannon placed at the entrance of it; so that now the island is rendered perfectly secure against all regular approaches or sudden attacks.

HELEN, (in fab. hist.) the daughter of Tyndarus and Leda, was married to Menelaus king of Sparta, but was stolen from him by Theseus, 1235 B. C. She was restored soon after; but carried off again by Paris, the Trojan prince; which occasioned the famous Trojan war. See Troy.

HELENIUM, BASTARD SUN-FLOWER; a genus of the polygamia superflua order, belonging to the syngenesia class of plants.

Species. 1. The autumnale, with spear-shaped narrow leaves. 2. The latifolium, with pointed, spear-shaped, fawed leaves.—Both these are natives of North America, where they grow wild in great plenty. They rise to the height of seven or eight feet in good ground. The roots, when large, send up a great number of stalks, which branch toward the top; the upper part of the stalk sustains one yellow flower shaped like the sun-flower, but much smaller, having long rays, which are jagged pretty deep into four or five segments.

Culture. These plants may be propagated by seeds, or by parting their roots; the latter is generally practised in this country. The best season to transplant and part the old roots is in October when their leaves are past, or in the beginning of March just before they begin to shoot. They delight in a soil rather moist than dry, provided it is not too strong, or does not hold the wet in winter.

Heliza
Heliasta.

HELEPOLIS, in the ancient art of war, a machine for battering down the walls of a place besieged, the invention of which is ascribed to Demetrius Poliorcetes.—Diodorus Siculus says, that each side of the Helepolis was 405 cubits in breadth, and 90 in height; that it had nine stages, and was carried on four strong solid wheels eight cubits in diameter; that it was armed with large battering rams, and had two roofs capable of supporting them; that in the lower stages there were different sorts of engines for casting stones; and in the middle they had large catapultas for discharging arrows, and smaller ones in those above, with a number of expert men for working all these machines.

HELIÆA, in Grecian antiquity, was the greatest and most frequented court in Athens for the trial of civil affairs. See HELIASTÆ.

HELIACAL, in astronomy, a term applied to the rising and setting of the stars; or, more strictly speaking, to their emergence out off, and immersion into, the rays and superior-splendor of the sun.—A star is said to rise heliacally, when, after having been in conjunction with the sun, and on that account invisible, it comes to be at such a distance from him, as to be seen in the morning before sun-rising; the sun, by his apparent motion, receding from the star towards the East. On the contrary, the heliacal setting is, when the sun approaches so near a star as to hide it with his beams, which prevent the fainter light of the star from being perceived; so that the terms *apparition* and *occultation* would be more proper than *rising* and *setting*.

HELIANTHUS, the GREAT SUNFLOWER; a genus of the polygamia frustanea order, belonging to the syngenesia class of plants. There are 12 species, most of which are now very common in our gardens, tho' all of them are natives of America. They are all very hardy, and will prosper in almost any soil or situation. They may be propagated either by seeds, or by parting their roots.

HELIASTÆ, in antiquity, the judges of the court HELIÆA. They were so called, according to some authors, from a Greek word which signifies *to assemble in a great number*; and, according to others, from another word which signifies *the sun*, because they held their assemblies in an open place. They composed not only the most numerous, but likewise the most important of the Athenian tribunals; for their province was either to explain the obscure laws, or to give new vigour and authority to those which had been violated. The Themiothetæ convoked the assembly of the Heliastæ, which sometimes amounted to 1000, sometimes to 1500 judges. Mr Blanchard is of opinion, that, to make this number, the Themiothetæ sometimes summoned those of each tribe who had last quitted the public offices which they had exercised in another court.

However that may be, it appears that the assemblies of the Heliastæ were not frequent, as they would have interrupted the jurisdiction of the stated tribunals, and the common course of affairs.

The Themiothetæ paid to each member of this assembly, for his attendance, three oboli: which are equal to two Roman sesterces, or to half a drachma. Hence Aristophanes terms them *the brothers of the triobolus*.

Heliaſtae. *tribolus*. They were likewise condemned to pay a fine if they came too late; and if they did not preſent themſelves till after the orators had begun to ſpeak, they were not admitted. Their attendance was required out of the public treaſury, and their pay was called *niſthor heliaſtius*.

The aſſembly met, at firſt, according to Ariſtophanes, at the riſing of the fun. If the judges were obliged to meet under cover on account of froſt and ſnow, they had a fire; but there is not a paſſage in any ancient author which informs us of the place where theſe aſſemblies were held, either in the rigorous or in the mild ſeaſons. We only learn that there was a double incloſure around the aſſembly, that it might not be diſturbed. The firſt was a kind of arbor-work, from ſpace to ſpace, ſeparated by doors, over which were painted in red the ten or twelve firſt letters of the Greek alphabet, which directed the entrance of the officers who compoſed the tribunal, each of them entering under the letter which diſtinguiſhed his tribe. The beaſtles of the court, to whom they ſhewed the wands which had been ſent them by the Theſmothetæ as a ſummons to meet, examined its mark, to ſee if it was authentic, and then introduced them. The ſecond incloſure, which was at the diſtance of 20 feet from the former, was a rope, or cord; that the people who ſtood round the firſt incloſure, and were deſirous to ſee what paſſed within the ſecond, might not be prevented from gratifying their curioſity at a proper diſtance. Thus the attention of the judges was not interrupted by the concourſe of the multitude, many of whom were heated by views of intereſt or of party.

To each of the members of the aſſembly were diſtributed two pieces of copper; one of which was perforated, not, certainly, that it might be diſtinguiſhed from the other by feeling; for theſe aſſemblies met at the riſing, and were diſſolved at the ſetting of the fun. Thoſe pieces of copper had been ſubſtituted for little ſea-ſhells, which were at firſt in uſe. The king was preſent at the aſſembly, at whoſe command it had been ſummoned. The Theſmothetæ read the names of thoſe who were to compoſe it, and each man took his place as he was called. The Theſmothetæ were then ſent for, whoſe function it was to obſerve prodigies, and to ſuperintend the ſacrifices; and if they gave their function, the deliberations were begun. It is well known, that the officers called *Exegetæ* were often corrupted by thoſe who were intereſted in the debates of the aſſembly; and that they excited ſuch tumults as were raiſed by the Roman tribunal in the popular aſſemblies convoked by the conſuls.

Of all the monuments which remain relating to the Heliaſtæ, the moſt curious is the oath which thoſe judges took before the Theſmothetæ: Demotheſthenes hath preſerved it in his oration againſt Timocrates, who having been bribed by thoſe who had been intruſted with the effects taken on board a veſſel of Naucratis, and reſuſed to give an account of them, got a law paſſed, by which an enlargement was granted to priſoners for public debts, on giving bail. Demotheſthenes, in making his oration againſt that law, ordered the oath of the Heliaſtæ to be read aloud, as a perpetual auxiliary to his arguments, and happily calculated to intereſt the multitude and inflame their

paſſions. This oath we ſhall quote, that our readers may know how reſpectable a tribunal that of the Heliaſtæ was, and the importance of their deciſions.

“ I will judge according to the laws and decrees of the people of Athens, and of the ſenate of 500.
“ I will never give my vote for the eſtabliſhment of a tyrant, nor of an oligarchy. Nor will I ever give my approbation to an opinion prejudicial to the liberty, or to the union, of the people of Athens.
“ I will not ſecond thoſe perſons who may propoſe a reduction of private debts, or a diſtribution of the lands or houſes of the Athenians. I will not recall exiles, nor endeavour to procure a pardon for thoſe who ſhall be condemned to die. Nor will I force thoſe to retire whom the laws and the ſuffrages of the people ſhall permit to remain in their country.
“ I will not give my vote to any candidate for a public function, who gives not an account of his conduct in the office which he has preſervingly filled; nor will I preſume to ſolicit any truſt from the commonwealth, without ſubjecting myſelf to this condition, which I mean as obligatory to the nine archons, to the chief of religious matters, to thoſe who are balloted on the ſame day with the nine archons, to the herald, the ambaffador, and the other officers of their court. I will not ſuffer the ſame man to hold the ſame office twice, or to hold two offices in the ſame year. I will not accept any preſent, either myſelf or by another, either directly or indirectly, as a member of the Heliaſtic aſſembly.
“ I ſolemnly declare that I am 30 years old. I will be equally attentive and impartial to the accuſer and the accuſed; I will give my ſentence rigorouſly according to evidence. Thus I ſwear, by Jupiter, by Neptune, and by Ceres, to act. And if I violate any of my engagements, I imprecate, from theſe deities, ruin on myſelf and my family. And I requeſt them to grant me every kind of proſperity, if I am faithful to my oath.”

The reader ſhould perſuade what follows this oath, to ſee with what eloquence Demotheſthenes avails himſelf of it, and how he applies its principles to the cauſe which he defends.

Here we have one of the motives of the meeting of this aſſembly. Ariſtotle informs us of another; which was, by the public authority, deputed to them, to elect a magiſtrate in the room of one dead. It is ſurpriſing, that Pauſanias, who enters ſo often into details, gives us no particular account of this aſſembly. All that he ſays of it is, that the moſt numerous of the Athenian aſſemblies was called *Helicæ*.

We are told by Diogenes Laertius, in his life of Solon, that it was before one of theſe Heliaſtic aſſemblies that Piſiſtratus preſented himſelf, covered with wounds and contuſions, (for thus he had treated himſelf and the mules which drew his car,) to excite the indignation of the people againſt his pretended enemies, who, jealous, as he alleged, of the popularity he had acquired by aſſerting the rights of his poorer fellow-citizens, in oppoſition to the men in power, had attacked him while he was hunting, and had wounded him in that barbarous manner. His deſign ſucceeded; a guard was appointed him, by the aſſiſtance of which he acquired the ſovereignty or tyranny of Athens, and kept it 33 years. The power of the aſſembly

assembly appeared remarkable on that occasion; for Solon, who was present, opposed it with all his efforts, and did not succeed.

As to the manner in which the judges gave their suffrages, there was a sort of vessel, covered with an osier mat, on which were placed two urns, the one of copper, the other of wood. In the lid of these urns there was an oblong hole, which was large at the top, and grew narrower downwards, as we see in some old boxes of our churches. The suffrages which condemned the accused person, were thrown into the wooden urn, which was termed *kyrios*. That of copper, named *akynos*, received those which absolved him.

Aristotle observes, that Solon, whose aim was to make his people happy, and who found an aristocracy established by the election of the nine archons, (annual officers, whose power was almost absolute,) tempered their sovereignty, by instituting the privilege of appealing from them to the people, who were to be assembled by lot to give their suffrage; after having taken the oath of the Heliastra, in a place near the Panathenæum; where Hippias had, in former days, calmed a sedition of the people, and bound them to unanimity by an oath. It has likewise been remarked, that the god Apollo was not invoked in the oath of the Heliastra, as in the oaths of the other judges. We have observed, that he who took the oath of the Heliastra, engaged that he would not be corrupted by solicitation or money. Those who violated this part of their oath, were condemned to pay a severe fine. The decemvirs at Rome made such corruption a capital crime. But Aconius remarks, that the punishment denounced against them was mitigated in later times; and that they were expelled the senate, or banished for a certain time, according to the degree of their guilt.

HELICON, (anc. geog.), a mountain on the borders of Bœotia and Phocis; of fertile soil, covered with woods, and very extensive, its north side touching Phocis, and partly its west side, quite to Mychos, its utmost port-town. There also we have the river Helicon; which sinking in the earth rises again at some distance under a new name, *Baphyræ*. This mountain is the poets' sport and delight: *Heliconius* the epithet; *Heliconiades*, and *Heliconides*, the muses.

HELICTERES, the SCREW-TREE; a genus of the decandria order, belonging to the gynandria class of plants. There are four species, all natives of warm climates. They are shrubby plants, rising from five to fourteen feet in height, adorned with flowers of a yellow colour. They are propagated by seeds; but are tender, and in this country must be kept in a stove during the winter.

HELIOCENTRIC LATITUDE of a Planet, the inclination of a line drawn between the centre of the sun, and the centre of a planet, to the plane of the ecliptic.

HELIOCENTRIC PLACE of a Planet, the place of the ecliptic wherein the planet would appear to a spectator placed at the centre of the sun.

HELIOCOMETES, a phenomenon sometimes observed about sunset; being a large luminous tail or column of light proceeding from the body of the sun, and dragging after it, not unlike the tail of a comet; whence the name.

HELIODORUS of PHOENICIA, bishop of Trica in Thessaly, better known by the romance he composed in his youth, entitled *Æthiopica*, and relating the amours of Theagenes and Chariclea. Some say he was deposed by a lynod, because he would not consent to the suppressing of that romance; the fable has a moral tendency, and particularly inculcates the virtue of chastity. As it was the first of this species of writing, he is styled the *Father of Romances*. He was also a good Latin poet. He lived in the 4th century.

HELIOPOLIS, (anc. geog.), so called by Herodotus and Diodorus Siculus, by Moses *On*, and in Jeremiah *Bethfemes*; a city of Egypt, to the south-east of the Delta, and east of Memphis; of a very old standing, its origin terminating in fable. Here stood the temple of the sun, held in religious veneration. The city stood on an extraordinary mount, but in Strabo's time was desolate. It gave name to the *Nomos Heliopolites*.—There was another *Heliopolis* in Cœlosyria, near the springs of the Orontes; so called from the worship of the sun, which was in great vogue over all Syria.

HELIOSCOPE, in optics, a sort of telescope, peculiarly fitted for viewing the sun, without hurting the eyes. See TELESCOPE.

As the sun may be viewed through coloured glasses, without hurt to the eyes, if the object and eye glasses of a telescope be made of coloured glass, as red or green, such a telescope will become an helioscope.

But Mr Huygens only used a plain glass, blacked at the flame of a candle on one side, and placed between the eye-glass and the eye; which answers the design of an helioscope very well.

HELIOSTATATA, in optics, an instrument invented by the late learned Dr 'S. Gravelande; who gave it this name from its fixing, as it were, the rays of the sun in an horizontal direction across the dark chamber all the while it is in use. See OPTICS.

HELIOTROPIUM, TURNSOLE; a genus of the monogynia order, belonging to the pentandria class of plants. There are a number of species, all of them natives of warm countries. Only one, called the *tricoccum*, grows in Europe; and is a native of France, Spain, and Italy. It is only remarkable for the property of its berries, of which an account is given under COLOUR-Making, n° 35.

HELIX, in anatomy. See there, n° 405.

HELIX, the *Snail*, in zoology, a genus belonging to the order of vermes testacea. The shell consists of one spiral, brittle, and almost diaphanous valve; and the aperture is narrow. There are 60 species, principally distinguished by the figure of their shells. They are of various sizes, from that of a small apple to less than half a pea. Some of them live on land, frequenting woods and gardens, or inhabiting clefts of rocks and dry sand-banks. Others of them are aquatic, inhabiting ponds, deep rivers, and the ocean. The principal species are,

1. The *Janthina*, with a violet-coloured shell, is remarkable for the extreme thinness of its texture, which breaks with least pressure, and seems therefore entirely calculated to keep the open sea, or at least to shun rocky shores. It inhabits the seas of Europe, especially the Mediterranean; those of Asia and Africa; and

Helix,
Hell.

and also the ocean. The living animal, when touched, exudes a juice, which stains the hands of a violet colour. Dr Hawkefworth, in his account of Cooke's voyage, mistakes this shell for that which yielded the *purpura* of the ancients. But whoever looks into Pliny, can never have the least idea that the thin shell aforementioned could be the same with it. They had several shells which yielded the purple dye: but these were all rock-shells *, and very different, both in figure and hardness, from the little helix jacintha; which is not calculated for the neighbourhood of rocks, as already mentioned. Vid. *Plin.* lib. v. cap. 1. and lib. ix. cap. 60, 61. See also Don Ant. Ulloa's voyage to South America, book iv. ch. 8.

2. The pomatia, or exotic snail, with five spires, most remarkably ventricose, and fasciated with a lighter and a deeper brown, is a native of France, where it inhabits the woods; but has been naturalized in England, where it inhabits the woods of the southern counties. It was introduced, as it is said, by Sir Kenelm Digby; whether for medical purposes, or as food, is uncertain: tradition says, that to cure his beloved wife of a decay was the object.—They are quite confined to our southern counties. An attempt was made to bring them into Northamptonshire, but they would not live there.—These are used as a food in several parts of Europe during lent; and are preserved in an escargatoire, or a large place boarded in, with a floor covered half a foot deep with herbs, in which the snails nestle and fatten *.—They were also a favourite dish with the Romans, who had their *cochlearia*, a nursery similar to the above. Fulvius Hirpinus † was the first inventor of this luxury, a little before the civil wars between Cæsar and Pompey. The snails were fed with bran and foddin wine. If we could credit Varro ‡, they grew so large, that the shells of some would hold ten quarts! People need not admire the temperance of the supper of the younger Pliny §, which consisted of only a lettuce a-piece, three snails, two eggs, a barley-cake, sweet wine and snow,—in case his snails bore any proportion in size to those of Hirpinus.—Its name is derived not from any thing relating to an orchard, but from *opusculum*, an *operculum*, it having a very strong one. This seems to be the species described by Pliny, lib. viii. c. 39. which he says was scarce; that it covered itself with the opercle, and lodged under ground; and that they were at first found only about the maritime Alps, and more lately near Velitæ. [See Plate CLVIII. the figure half the natural size.]

3. The hortensis, or garden-snail, is in form like the last, but lesser, and not umbilicated and clouded, or mottled with browns.—These are often used with success in consumptive cases.

HELL, the place of divine punishment after death. As all religions have supposed a future state of existence after this life, so all have their hell or place of torment in which the wicked are supposed to be punished. The hell of the ancient heathens was divided into two mansions; the one called *Elysium*, on the right hand, pleasant and delightful, appointed for the souls of good men; the other called *Tartara*, on the left, a region of misery and torment, appointed for the wicked. The latter only was hell, in the present restrained sense of the word. See *ELYSIUM*.

HELL, the place of divine punishment after death. As all religions have supposed a future state of existence after this life, so all have their hell or place of torment in which the wicked are supposed to be punished. The hell of the ancient heathens was divided into two mansions; the one called *Elysium*, on the right hand, pleasant and delightful, appointed for the souls of good men; the other called *Tartara*, on the left, a region of misery and torment, appointed for the wicked. The latter only was hell, in the present restrained sense of the word. See *ELYSIUM*.

HELL, the place of divine punishment after death. As all religions have supposed a future state of existence after this life, so all have their hell or place of torment in which the wicked are supposed to be punished. The hell of the ancient heathens was divided into two mansions; the one called *Elysium*, on the right hand, pleasant and delightful, appointed for the souls of good men; the other called *Tartara*, on the left, a region of misery and torment, appointed for the wicked. The latter only was hell, in the present restrained sense of the word. See *ELYSIUM*.

The philosophers were of opinion, that the infernal regions were at an equal distance from all the parts of the earth; nevertheless it was the opinion of some, that there were certain passages which led thither, as the river Lethe near the Syrtis, and the Acherusian cave in Epirus. At Hermione it was thought, that there was a very short way to hell; for which reason the people of that country never put the fare into the mouths of the dead to pay their passage.

The Jews placed hell in the centre of the earth, and believed it to be situated under waters and mountains. According to them, there are three passages leading to it: the first is in the wilderness, and by that Korah, Dathan, and Abiram, descended into hell; the second is in the sea, because Jonah, who was thrown into the sea, cried to God out of the belly of hell; the third is in Jerusalem, because it is said the fire of the Lord is in Zion, and his furnace is in Jerusalem. They likewise acknowledged seven degrees of pain in hell, because they find this place called by seven different names in scripture. Though they believed that infidels, and persons eminently wicked, will continue for ever in hell; yet they maintained, that every Jew who is not infected with some heresy, and has not acted contrary to the points mentioned by the rabbins, will not be punished therein for any other crimes above a year at most.

The Mahometans believe the eternity of rewards and punishments in another life. In the Koran it is said, that hell has seven gates, the first for the Mussulmans, the second for the Christians, the third for the Jews, the fourth for the Sabians, the fifth for the Magians, the sixth for the Pagans, and the seventh for the hypocrites of all religions.

Among Christians, there are two controverted questions in regard to hell; the one concerns locality, the other the duration of its torments. The locality of hell, and the reality of its fire, began first to be controverted by Origen. That father, interpreting the scripture account metaphorically, makes hell to consist, not in external punishments, but in a consciousness or sense of guilt, and a remembrance of past pleasures. Among the moderns, Mr Whiston advanced a new hypothesis. According to him, the comets are so many hells appointed in their orbits alternately to carry the damned into the confines of the sun, there to be scorched by its violent heat, and then to return with them beyond the orb of Saturn, there to starve them in these cold and dismal regions. Another modern author, not satisfied with any hypothesis hitherto advanced, assigns the sun to be the local hell. As to the second question, viz. the duration of hell-torments, we have Origen again at the head of those who deny that they are eternal; it being that father's opinion, that not only men, but devils, after a due course of punishment suitable to their respective crimes, shall be pardoned and restored to heaven. The chief principle upon which Origen built his opinion, was the nature of punishment, which he took to be emendatory, applied only as a physic for the recovery of the patient's health. The chief objection to the eternity of hell-torments among modern writers, is the disproportion between temporary crimes and eternal punishments. Those who maintain the affirmative, ground their opinions on scripture-accounts, which represent

Hell.

* See *Bucinum* and *Murex*.* *Addison's Trav.* 272.† *Pliny*, l. x. c. 56.‡ *L. iii.* c. 14.§ *Epist.* xv.

Hellanicus represent the pains of hell under the figure of a worm which never dies, and a fire which is not quenched; as also upon the words, "These shall go away into everlasting punishment, but the righteous into life eternal."

HELLANICUS of Mitylene, a celebrated Greek historian, born before Herodotus, flourished about 480 B. C. He wrote a history of the ancient kings and founders of cities, but which hath not come down to us.

HELLAS, (anc. geog.), an appellation comprising, according to the more ancient Greeks and Romans, Achaia and Peloponnesus, but afterwards restrained to Achaia. It was bounded on the west by the river Achelous, on the north by mounts Othrys and Ossa, on the east by the Egean sea, and on the south by the Saronic and Corinthian bays, and by the isthmus which joins it to Peloponnesus. It was called *Hellas*, from *Hellen* the son of Deucalion; or from *Hellas*, a district of Thessaly; whence *Hellene*, the gentilitious name, denoting *Greeks*. Now called *Livadia*.

HELLEBORUS, HELLEBORE; a genus of the polygynia order, belonging to the polyandria class of plants.

Species. The most remarkable species of this plant is the niger, commonly called *Christmas rose*. It hath roots composed of many thick fleshy spreading fibres, crowned by a large cluster of lobbed leaves, consisting each of seven or eight obtuse fleshy lobes, united to one foot-stalk; and between the leaves several thick fleshy flower-stalks three or four inches high, surmounted by large beautiful white flowers of five roundish petals, and numerous filaments, appearing in winter, about or soon after Christmas.

Culture. This plant may be propagated either by seeds or parting the roots. It prospers in the open borders, or may be planted in pots to move when in bloom in order to adorn any particular place; but it always flowers fairest and most abundantly in the front of a warm sunny border. The plants may be removed, and the roots divided for propagation, in September, October, or November; but the sooner in autumn it is done, the stronger will the plants flower at their proper season.

Uses. The root of this plant was anciently used as a cathartic. The taste of it is acrid and bitter. Its acrimony, as Dr Grew observes, is first felt on the tip of the tongue, and then spreads itself immediately to the middle, without being much perceived in the intermediate part. On chewing the root for a few minutes, the tongue seems benumbed, and affected with a kind of paralytic stupor, as when burnt by eating any thing too hot. The fibres are more acrimonious than the head of the root from whence they issue. Black hellebore root, taken from 15 to 30 grains, proves a strong cathartic; and, as such, has been celebrated for the cure of maniacal and other disorders proceeding from what the ancients called the *atrabilis*; in which cases, medicines of this kind are doubtless occasionally of use, though they are by no means possessed of any specific power. It does not however appear, that our black hellebore acts with so much violence as that of the ancients; whence many have supposed it to be a different species of plant: and indeed the descriptions which the ancients have left us of their hellebore, do

not agree with those of any of the sorts usually taken notice of by modern botanists. Another species has been discovered in the Eastern countries, which Tournefort distinguishes by the name of *helleborus niger orientalis, amplifolius folio, caule præalto, flore purpurascente*, and supposes to be the true ancient hellebore, from its growing in plenty about mount Olympus, and in the island of Anticyra, celebrated of old for the production of this antimaniacal drug: he relates, that a scruple of this sort, given for a dose, occasioned convulsions.—Our hellebore is at present looked upon principally as an alterative; and in this light is frequently employed, in small doses, for attenuating viscid humours, promoting the uterine and urinary discharges, and opening inveterate obstructions of the remoter glands. It often proves a powerful emmenagogue in plethoric habits, where steel is ineffectual or improper. In some parts of Germany, a species of black hellebore has been made use of, which frequently produced violent, and sometimes deleterious, effects. It appears to be the fetid kind of Linnaeus, called in English *settlewort, fetterwort, or bastard hellebore*. The roots of this may be distinguished from those of the true kind, by their being less black.

HELLEN, the son of Deucalion, is said to have given the name of Hellenists to the people before called *Greeks*, 1521 B. C. See GREECE.

HELLENISM, in matters of language, a phrase in the idiom, genius, or construction of the Greek tongue.

This word is only used when speaking of the authors who, writing in a different language, express themselves in a phraseology peculiar to the Greek.

HELLENISTIC LANGUAGE, that used by the Grecian Jews who lived in Egypt and other parts where the Greek tongue prevailed. In this language it is said the Septuagint was written, and also the books of the New Testament; and that it was thus denominated to shew that it was Greek filled with Hebraisms and Syriacisms.

HELLESPONT, the entrance of the streights which divides Asia from Europe, and passes from the Archipelago to Constantinople. It is now called the *Dardanelles*, and is about two miles wide.

HELM, a long and flat piece of timber, or an assemblage of several pieces, suspended along the hind-part of a ship's stern-post, where it turns upon hinges to the right or left, serving to direct the course of the vessel, as the tail of a fish guides the body.

The helm is usually composed of three parts, viz. the rudder, the tiller, and the wheel, except in small vessels, where the wheel is unnecessary.

As to the form of the rudder, it becomes gradually broader in proportion to its distance from the top, or to its depth under the water. The *back*, or inner part of it, which joins to the stern-post, is diminished into the form of a wedge throughout its whole length, so as that the rudder may be more easily turned from one side to the other, where it makes an obtuse angle with the keel. It is supported upon hinges; of which those that are bolted round the stern-post to the after-extremity of the ship, are called *googings*, and are furnished with a large hole on the after-part of the stern-post. The other parts of the hinges, which are bolted to the back of the rudder, are called *pintles*, being strong cylindrical pins, which enter into the googings, and

Hellen
||
Helm.

and rest upon them. The length and thickness of the rudder is nearly equal to that of the stern-post.

The rudder is turned upon its hinges by means of a long bar of timber, called the *tiller*, which is fixed horizontally in its upper end within the vessel. The movements of the tiller to the right and left, accordingly, direct the efforts of the rudder to the government of the ship's course as she advances; which, in the sea language, is called *steering*. The operations of the tiller are guided and assisted by a sort of tackle, communicating with the ship's side, called the *tiller-rope*, which is usually composed of untarred rope-yarns for the purpose of traversing more readily through the blocks or pulleys.

In order to facilitate the management of the helm, the tiller-rope, in all large vessels, is wound about a wheel, which acts upon it with the powers of a crane or windlass. The rope employed in this service being conveyed from the fore-end of the tiller *k*, to a single block *i*, on each side of the ship†, is farther communicated to the wheel, by means of two blocks suspended near the mizen-mast, and two holes immediately above, leading up to the wheel, which is fixed upon an axis on the quarter-deck, almost perpendicularly over the fore-end of the tiller. Five turns of the tiller-rope are usually wound about the barrel of the wheel; and, when the helm is amidship, the middle turn is nailed to the top of the barrel, with a mark by which the helmsman readily discovers the situation of the helm, as the wheel turns it from the starboard to the larboard side. The spokes of the wheel generally reach about eight inches beyond the rim or circumference, serving as handles to the person who steers the vessel. As the effect of a lever increases in proportion to the length of its arm, it is evident that the power of the helmsman to turn the wheel will be increased according to the length of the spokes beyond the circumference of the barrel.

When the helm, instead of lying in a right line with the keel, is turned to one side or the other, as in BD, fig. 1. it receives an immediate shock from the water, which glides along the ship's bottom in running *ast* from A to B; and this fluid pushes it towards the opposite side, whilst it is retained in this position: so that the stern, to which the rudder is confined, receives the same impression, and accordingly turns from B to *b* about some point *c*, whilst the head of the ship passes from A to *a*. It must be observed, that the current of water falls upon the rudder obliquely, and only strikes it with that part of its motion which acts according to the sine of incidence, pushing it in the direction NP, with a force which not only depends on the velocity of the ship's course, by which this current of water is produced, but also upon the extent of the sine of incidence. This force is by consequence composed of the square of the velocity with which the ship advances, and the square of the sine of incidence, which will necessarily be greater or smaller according to circumstances; so that if the vessel runs three or four times more swiftly, the absolute shock of the water upon the rudder will be nine or sixteen times stronger under the same incidence: and, if the incidence is increased, it will yet be augmented in a greater proportion, because the square of the sine of incidence is more enlarged. This impression, or, what is the

same thing, the power of the helm, is always very feeble, when compared with the weight of the vessel; but as it operates with the force of a long lever, its efforts to turn the ship are extremely advantageous. For the helm being applied to a great distance from the centre of gravity G, or from the point about which the vessel turns horizontally, if the direction PN of the impression of the water upon the rudder be prolonged, it is evident that it will pass perpendicularly to R, widely distant from the centre of gravity G: thus the absolute effort of the water is very powerful. It is not therefore surprising, that this machine impresses the ship with a considerable circular movement, by pushing the stern from B to *b*, and the head from A to *a*; and even much farther whilst she sails with rapidity, because the effect of the helm always keeps pace with the velocity with which the vessel advances.

Amongst the several angles that the rudder makes with the keel, there is always one position more favourable than any of the others, as it more readily produces the desired effect of turning the ship, in order to change her course. To ascertain this, it must be considered, that if the obliquity of the rudder with the keel is greater than the obtuse angle ABD, so as to diminish that angle, the action of the water upon the rudder will increase, and at the same time oppose the course of the ship in a greater degree; because the angle of incidence will be more open, so as to present a greater surface to the shock of the water, by opposing its passage more perpendicularly. But at that time the direction NP of the effort of the helm upon the ship will pass, with a smaller distance from the centre of gravity G towards R, and less approach the perpendicular NL, according to which it is absolutely necessary that the power applied should act with a greater effect to turn the vessel. Thus it is evident, that if the obtuse angle ABD is too much inclosed, the greatest impulse of the water will not counterbalance the loss sustained by the distance of the direction NP from NL, or by the great obliquity which is given to the same direction NP of the absolute effort of the helm with the keel AB. If, on the contrary, the angle ABD is too much opened, the direction NP of the force of the action of the helm will become more advantageous to turn the vessel, because it will approach nearer the perpendicular NL; so that the line prolonged from NP will increase the line GR, by removing R to a greater distance from the centre of gravity G: but then the helm will receive the impression of the water too obliquely, for the angle of incidence will be more acute; so that it will only present a small portion of its breadth to the shock of the water, and by consequence will only receive a feeble effort. By this principle it is easy to conceive, that the greatest distance GR from the centre of gravity G, is not sufficient to repair the diminution of force occasioned by the too great obliquity of the shock of the water. Hence we may conclude, that when the water either strikes the helm too directly, or too obliquely, it loses a great deal of the effect it ought to produce. Between the two extremes there is therefore a mean position, which is the most favourable to its operations.

The diagonal NP of the rectangle IL represents the absolute direction of the effort of the water upon the helm. NI expresses the portion of this effort which is

opposed to the ship's head-way, or which pushes her altern, in a direction parallel to the keel. It is easily perceived, that this part NI of the whole power of the helm contributes but little to turn the vessel; for, if IN is prolonged, it appears that its direction approaches to a very small distance GV from the centre of gravity G; and that the arm of the lever $BN=GV$, to which the force is applied, is not in the whole more than equal to half the breadth of the rudder: but the relative force NL, which acts perpendicular to the keel, is extremely different. If the first NI is almost useless, and even pernicious, by retarding the velocity; the second NL is capable of a very great effect, because it operates at a considerable distance from the centre of gravity G of the ship, and acts upon the arm of a lever GE, which is very long. Thus it appears, that between the effects NL and NI, which result from the absolute effort NP, there is one which always opposes the ship's course, and contributes little to her motion of turning; whilst the other produces only this movement of rotation, without operating to retard her velocity.

Geometricians have determined the most advantageous angle made by the helm with the line prolonged from the keel, and fixed it at $54^{\circ} 44'$, presuming that the ship is as narrow at her floating-line, or at the line described by the surface of the water round her bottom, as at the keel. But as this supposition is absolutely false, inasmuch as all vessels augment their breadth from the keel upward to the extreme breadth, where the floating-line or the highest water-line is terminated; it follows, that this angle is too large by a certain number of degrees. For the rudder is impressed by the water, at the height of the floating-line, more directly than at the keel, because the fluid exactly follows the horizontal outlines of the bottom: so that a particular position of the helm might be supposed necessary for each different incidence which it encounters from the keel upwards. But as a middle position may be taken between all these points, it will be sufficient to consider the angle formed by the sides of the ship, and her axis, or the middle-line of her length, at the surface of the water, in order to determine afterwards the mean point, and the mean angle of incidence.

It is evident that the angle $54^{\circ} 44'$ is too open, and very unfavourable to the ship's head-way, because the water acts upon the rudder there with too great a sine of incidence, as being equal to that of the angle which it makes with the line prolonged from the keel below: but above, the shock of the water is almost perpendicular to the rudder, because of the breadth of the bottom, as we have already remarked. If then the rudder is only opposed to the fluid, by making an angle of 45° with the line prolonged from the keel, the impression, by becoming weaker, will be less opposed to the ship's head-way, and the direction NP of the absolute effort of the water upon the helm drawing nearer to the lateral perpendicular, will be placed more advantageously, for the reasons above-mentioned. On the other hand, experience daily testifies, that a ship steers well when the rudder makes the angle DBE equal to 35° only.

It has been already remarked, that the effect of moving the wheel to govern the helm increases in pro-

portion to the length of the spokes; and so great is the power of the wheel, that if the helmsman employs a force upon its spokes equivalent to 30 pounds, it will produce an effect of 90 or 120 pounds upon the tiller. On the contrary, the action of the water is collected into the middle of the breadth of the rudder, which is very narrow in comparison with the length of the tiller; so the effort of the water is very little removed from the fulcrum B upon which it turns; whereas the tiller forms the arm of a lever 10 or 15 times longer, which also increases the power of the helmsman in the same proportion that the tiller bears to the lever upon which the impulse of the water is directed. This force then is by consequence 10 or 15 times stronger; and the effort of 30 pounds, which at first gave the helmsman a power equal to 90 or 120 pounds, becomes accumulated to one of 900 or 1800 pounds upon the rudder. This advantage then arises from the shortness of the lever upon which the action of the water is impressed, and the great comparative length of the tiller, or lever, by which the rudder is governed; together with the additional power of the wheel that directs the movements of the tiller, and still farther accumulates the power of the helmsman over it. Such a demonstration ought to remove the surprise with which the prodigious effect of the helm is sometimes considered, from an inattention to its mechanism: for we need only to observe the pressure of the water, which acts at a great distance from the centre of gravity G, about which the ship is supposed to turn, and we shall easily perceive the difference there is between the effort of the water against the helmsman, and the effect of the same impulse against the vessel. With regard to the person who steers, the water acts only with the arm of a very short lever NB, of which B is the fulcrum: on the contrary, with regard to the ship, the force of the water is impressed in the direction NP, which passes to a great distance from G, and acts upon a very long lever EG, which renders the action of the rudder extremely powerful in turning the vessel; so that, in a large ship, the rudder receives a shock from the water of 2700 or 2800 pounds, which is frequently the case when the sails at the rate of three or four leagues by the hour; and this force being applied in E, perhaps 100 or 110 feet distant from the centre of gravity G, will operate upon the ship, to turn her about, with 270,000 or 308,000 pounds; whilst, in the latter case, the helmsman acts with an effort which exceeds not 30 pounds upon the spokes of the wheel.

After what has been said of the helm, it is easy to judge, that the more a ship increases her velocity with regard to the sea, the more powerful will be the effect of the rudder, because it acts against the water with a force, which increases as the square of the swiftness of the fluid, whether the ship advances or retreats; or, in other words, whether she has head-way or stern-way; with this distinction, that in these two circumstances the effects will be contrary. For if the vessel retreats, or moves altern, the helm will be impressed from L to N; and instead of being pushed, according to NP, it will receive the effort of the water from N towards R; so that the stern will be transported to the same movement, and the head turned in a contrary direction.

When the helm operates by itself, the centre of rotation.

Helmet
|
Helos.

tation of the ship, and her movement, are determined by estimating the force of this machine; that is to say, by multiplying the surface of the rudder by the square of the ship's velocity.

There are several terms in the sea-language relating to the helm; as, *Bear up the helm*; that is, Let the ship go more large before the wind. *Helm a mid ship*, or *right the helm*: that is, Keep it even with the middle of the ship. *Port the helm*, Put it over the left side of the ship. *Starboard the helm*, Put it on the right side of the ship.

HELMET, an ancient defensive armour worn by horsemen both in war and in tournaments. It covered both the head and face, only leaving an aperture in the front secured by bars, which was called the *visor*.

In achievements, it is placed above the escutcheon for the principal ornament, and is the true mark of chivalry and nobility. Helms vary according to the different degrees of those who bear them. They are also used as a bearing in coats of arms. See HERALDRY.

HELMINTHOLITHUS, in natural history, a name given by Linnæus to petrified bodies resembling worms.

Of these he reckons four genera. 1. Petrified lithophyta, found in the mountains of Sweden. 2. Petrified shells. 3. Petrified zoophytes. 4. Petrified reptiles.

HELMONT (John Baptist Van), a celebrated Flemish gentleman, was born at Brussels in 1577. He acquired much skill in natural philosophy, physic, and chemistry, that he was accounted a magician, and thrown into the inquisition: but having with difficulty justified himself, as soon as he was released he retired to Holland; where he died in 1644. He published, 1. *De magnetica corporum curatione*. 2. *Febrium doctrina inaudita*. 3. *Ortus medicine*. 4. *Paradoxa de aquis spadanis*; and other works, printed together in one volume folio.

HELMONT, a small town in the Netherlands, in Dutch Brabant, and capital of the district of Peelsand, with a good castle. It is seated on the river Aa, in E. Long. 5. 37. N. Lat. 51. 31.

HELMSTADT, a town of Germany, in the duchy of Brunswick, built by Charlemagne, in E. Long. 11. 10. N. Lat. 52. 20.

HELMSTADT, a strong maritime town of Sweden, and capital of the province of Holland, seated near the Baltic sea; in E. Long. 21. 5. N. Lat. 56. 44.

HELOISE, famous for her unfortunate affection for her tutor Abelard, and for her Latin letters to him after they had retired from the world. She died abbess of Paraclet in 1163. See ABELARD.

HELOS, (sæc. geog.), a maritime town of Laconia, situated between Trifafius and Acra; in Pausanias's time in ruins. The district was called *Holotea*, and the people *Holotes*, *Holotes*, *Helei*, and *Heleates*, by Stephanus; and *Ilotes*, by Livy. Being subdued by the Lacedæmonians, they were all reduced to a state of public slavery, or made the slaves of the public, on these conditions, viz. that they could neither recover their liberty nor be sold out of the territory of Sparta. Hence the term *ilacrum*, in Harpocration, for being in a state of slavery; and hence also the Lacedæmonians called the slaves of all nations whatever

helotes. *Holotius* is the epithet.

HELOTS, in Grecian antiquity, the slaves of the Spartans. See HELOS.—The freemen of Sparta were forbidden the exercise of any mean or mechanical employment, and therefore the whole care of supplying the city with necessaries devolved upon the Helots.

HELSINBURG. See ELISMURG.

HELSINGIA, a province of Sweden, bounded on the north by Jemterland and Medelpadia; on the east by the Bothnic gulf, and on the south and west by Dalecarlia and Geftricia. It is full of mountains and forests, and the inhabitants are almost constantly employed in hunting and fishing. It has no cities: the principal towns are Hudwickvald, Alta, and Dilbo.

HELSINGIC CHARACTER, a peculiar kind of character found inscribed on stones in the province of Helgingia. The Runic and Heltingic characters may be easily transformed into each other.

HELSTON, a town of Cornwall in England, seated on the river Lowed, in W. Long. 5. 45. N. Lat. 50. 8. It contains about 400 houses, is well inhabited, and sends two members to parliament. The steeple with its spire, which is about 90 feet high, is a notable sea-mark. A little below the town is a harbour where several tin-ships take in their lading, and here is the largest market-house in the county. The inhabitants neither pay to the church nor poor, these being supported by the revenues of the town.

HELVETIUS (Adrian), an eminent physician, born in Holland. After having studied physic at Leyden, he went to Paris, where he acquired great reputation in his profession. He introduced in France the use of ipecacuanha in the cure of dysenteries, a remedy which he at first kept secret; but was ordered to make it public, and on that account received a gratification from the king of 1000 louis d'ors. He was made inspector-general of the hospitals in Flanders, physician to the duke of Orleans, regent of France, &c.; and died at Paris, in 1727, aged 65. He wrote a treatise on the most common diseases, and the remedies proper for their cure, (the best edition of which is that of 1724, in two volumes octavo); and other works.

HELVETIUS (John), son of the former, was born in 1685. He was bred to physic; in which line he became eminent both as a practitioner and a writer, but is best known by his famous philosophical work entitled *L'Esprit*. He died in 1755.

HELVICUS (Christopher), professor of divinity, Greek, and the Oriental tongues, in the university of Gissen, died in the flower of his age in 1617; after having published several books, and projected more. The Hebrew language was so familiar to him, that he spoke it as fluently as his mother tongue. He was not only a good grammarian, but also an able chronologist. His chronological tables have been greatly esteemed, though they are not free from errors.

HELVOET-SLUYS, a sea-port town of the United Netherlands, seated on the island of Voorn, in the province of Holland, and where the English packet-boats always go. It is but a small place, consisting only of a handsome quay, and two or three little streets. But it is very well fortified, and esteemed the safest harbour in the country. The largest men of war may come up to the middle of the town; and yet

Hellets
|
Helvoet-
Sluys.

Hemlar
||
Hemina.

it has but very little trade, because the merchants choose to live higher up the country. E. Long. 4. o. N. Lat. 51. 44.

HEMELAR (John), an eminent antiquary, and canon of Antwerp, in the 17th century, was born at the Hague; and wrote a work, entitled, *Expositio Numismatum imperatorum Romanorum à Julio Cesare ad Heraclium*; which is very scarce, though it has had several editions.

HEMATH, or HAMATH, (anc. geog.), the name of a city (whose king was David's friend, 2 Sam. ix.) to the south of Lebanon; from which a territory was called *Nemath*, on the north of Canaan and south of Syria, as appears by the spies, Numb. xiii. 1 Kings viii. Ezek. xlvii. Whether one or more cities and districts of this name lay in this tract, neither interpreters nor geographers are agreed. The eastern part was called *Hemath-zoba*, 2 Chron. viii. unless we suppose that there was a city in *Zoba* of this name fortified by Solomon. In defining the boundary of Palestine, it is often said, *from the entering of Hamath*; as a province to be entered into through a strait or defile. And if there was such, the next question is, From what metropolis it was called *Hemath*. Antioch, capital of Syria, is supposed to be called *Hemath* or *Amatha*, (Jonathan, Targum, &c.); and again, *Epiphania*, (Josephus.) Both were to the north of Lebanon; consequently not the *Hemath* of Scripture, the immediate boundary of Palestine to the north, and lying to the south of Lebanon.

HEMATITES. See HEMATITES.

HEMEROBIOUS, in zoology, a genus of insects of the neuroptera order, the characters of which are these. The mouth is furnished with two teeth; the palpi are four; the wings are deflected, but not plaited; and the antennæ are bristly, and longer than the breast. There are 15 species, principally distinguished by their colours.

HEMEROCALLIS, DAY-LILY, or *lily-asphodel*; a genus of the monogynia order, belonging to the hexandria class of plants.

Species. 1. The flava, or yellow day-lily, hath strong fibrous roots, sending up large hollow keel-shaped leaves, two feet long, upright, leafless, firm stalks, two feet high; dividing at top into several foot-stalks, each terminated by one large lilaceous yellow flower of an agreeable odour. Of this there is a variety called the *hemerocallis minor*, or small yellow day-lily. 2. The fulva, reddish, or copper-coloured day-lily, hath roots composed of strong fleshy fibres and large oblong tubes; radical, keel-shaped, hollow, pointed leaves, a yard long, reflexed at top; with leafless stalks three or four feet high, and large copper-coloured lilaceous flowers. These have large stamina, charged with a kind of brown-coloured farina; which, on being touched or smelled to, is discharged in great plenty all over the hands or face.

Culture. Both these species are hardy, and will thrive any where. They may be easily propagated by parting their roots in autumn, or almost any time after flowering or before they begin to flower.

HEMI, a word used in the composition of divers terms, signifying the same with *femi*, or *demi*, viz. "one half."

HEMINA, in Roman antiquity, a liquid measure,

which, according to Arbuthnot, was equal to half a Hemiplegia wine-pint English measure; its contents being 2.818 solid inches.

Hemp.

HEMIPLEGIA, or HEMIPLEXIA, among physicians, a palsy of one half of the body. See (the *Index* subjoined to) MEDICINE.

HEMISPHERE, in geometry, the half of a globe or sphere, when it is supposed to be cut thro' its centre in the plane of one of its great circles.

HEMISPHERE, is also used to denote a projection of half the terrestrial globe, or half the celestial sphere, on a plane, and frequently called *planisphere*.

HEMISTICH, in poetry, denotes half a verse, or a verse not completed.

Of this there are frequent examples in Virgil's *Æneid*; but whether they were left unfinished by design or not, is disputed among the learned: such are, *Ferro accincta vocat*, *Æn. II. v. 614.* And, *Italiam non sponte sequor*, *Æn. IV. v. 361.*

In reading common English verses, a short pause is required at the end of each hemistich or half-verse.

HEMITRITÆUS, in medicine, a kind of fever, denoting the same as semi-tertian, returning twice every day. The word is Greek, and compounded of *hemitritus*, "half," and *tertius*, "third, or tertian."

HEMLOCK, in botany. See CICUTA and CONIUM.

HEMOIPTOTON. See ORATORY, n° 77.

HEMP, in botany. See CANNABIS.

The raising and dressing of hemp scarcely differs from the raising and dressing of flax, but in the following particulars.

Hemp requires a light, free, dusty, and even a sandy warm soil; which if not naturally rich, must be made so by manure. New broke-up ground does not answer for hemp, producing it thin and poor upon the stalk. Hemp does well to follow beans. The ground should be ploughed and harrowed three or four times, a fortnight or three weeks intervening between each time. In some parts of Lincoln and Holland, the soil is naturally so free and rich, that it will produce hemp constantly year after year without manure. The leaves which fall off the stalk help to manure the ground. It is frequently sown with a view to clear the ground of weeds; which it does most effectually, growing fast, and soon checking every weed but mungwort, which is picked out with a fork.

It is sown about the first of May; so thin, that about four pecks are sufficient for an English acre; and the ground must then be covered as much as possible to preserve the seed from the birds, who are very fond of it.

The *taper-topped* stalk which does not bear the pods, is called the *female*; though in fact it is the *male*, scattering from its bloom a small dust, which impregnates the pods of the *bushy-topped*; which last is commonly, tho' improperly, called the *male* or *carle* hemp.

When hemp is the object of the farmer more than a crop of seed, the whole should be pulled when the stalk begins to grow yellow, and the earth remaining about the roots should be beat off to prevent more growth; but if the seed is wanted in its greatest perfection, the stalks bearing the pods must be pulled before the uppermost pod begins to open; the earth should

Hemp
Henoticon.

should not be beat off from the roots; it should be flaked in sheaves upon the field, to dry and win as corn; and the top of these flaked should be covered with undergrowth or the like, to preserve the seed from the birds.

Hemp is sooner watered than flax, and the canals must be deeper.

In keeping the seed, care must be taken to preserve it from rats, mice, and such like vermin, who are all fond of it.

It is dressed as coarse flax, but is sooner dressed; and its greater length requires more care, and renders it more troublesome in the handling, especially in the skutching of it by the water lint-mills with horizontal skutchers, when it must be folded double. What is too coarse and strong in the stalk for the hand or foot machines, may be broke and peeled by the hand. See FLAX.

HEMP-*Agri-mony*, a species of EUPATORIUM.—It has a very bitter taste. A decoction of the roots operates as a violent emetic and cathartic, and is sometimes taken by the lower class of people to cure the jaundice, dropsy, and cachexy; but is a rough medicine, and ought to be used with caution. Boerhaave made use of an infusion of this plant to foment ulcers and putrid sores. Tournefort informs us, that the Turks cure the scurvy with it. An ounce of the juice, or a dram of the extract, is a dose.

HEMPSTEAD, a town of Hertfordshire in England, seated among the hills on a branch of the river Coln. W. Long. 0. 40. N. Lat. 51. 44.

HEN, in ornithology. See PHASIANUS.

Guinea-HEN. See NUMIDA.

HEN-Bane. See HYOSCIAMUS.

HENDECAGON, in geometry, a figure that hath 11 sides and as many angles.

HENLEY, a town of Oxfordshire in England, seated on the river Thames, over which there is a handsome bridge. It sends malt, corn, and other things, to London in barges. W. Long. 0. 40. N. Lat. 51. 34.

HENLEY, a town of Warwickshire in England, seated on the river Alne, in W. Long. 1. 45. N. Lat. 52. 18.

HENNA, or ALHENNA. See LAWSONIA.

HENNEBERG, a county of Germany, in the circle of Franconia. It is bounded on the north by Thuringia, on the west by Hesse, on the south by the bishopric of Wertzburg, and on the east by that of Bamberg. It abounds in mountains and woods; and it is populous, and pretty fertile. Mainingen is the capital town.

HENNEBERG, a town of Germany, in the circle of Franconia, which gives title to a county of the same name, with a castle. E. Long. 9. 17. N. Lat. 50. 40.

HENNEBON, a town of France in Bretagne, in the diocese of Vannes. It is inhabited by rich merchants, and is seated on the river Blavet, in W. Long. 2. 13. N. Lat. 47. 48.

HENOTICON, in church-history, a decree or edict of the emperor Zeno, made at Constantinople in the year 482, by which he pretended to reconcile all parties under one faith. It is generally agreed, that Peter, patriarch of Alexandria, and Acacius, pa-

triarh of Constantinople, were the authors of this decree; and that their design was to compliment the emperor with a right of prescribing regulations in matters of faith. The emperor, by this decree, arrogated to himself the right of being head of the church. Pope Simplicius, however, in the year 483, condemned the henoticon, and cited Acacius to appear before him at Rome; but it was not entirely suppressed till the year 518.

HENRY, or CAPE-HENRY, the south cape of Virginia, at the entrance of Chesapeake-bay. W. Long. 74. 50. N. Lat. 37. 0.

HENRY, the name of several emperors of Germany, and kings of England and France. See ENGLAND, FRANCE, and GERMANY.

HENRY IV. emperor of Germany in 1056, styled *the Great*, was memorable for his quarrels with pope Gregory II. whom at one time he deposed, for having presumed to judge his sovereign; but at another, dreading the effects of the papal anathemas, he had the weakness to submit to the most humiliating personal solicitations and penances to obtain absolution, which impolitic measure increased the power of the Pope, and alienated the affections of his subjects: thus circumstanced, he reassumed the hero, but too late; marched with an army to Rome, expelled Gregory, deposed him, and set up another Pope. Gregory died soon after: but Urban II. and Pascal II. successively, excited his ambitious sons, Conrad and Henry, to rebel against him, and the latter was crowned emperor by the title of Henry V. in 1106; and he had the inhumanity to arrest his father, and to deprive him, not only of all his dignities, but even of the necessities of life. The unfortunate Henry IV. was reduced to such extremities, (after having fought 62 battles in defence of the German empire), that he solicited the bishop of Spire to grant him an under-chamber's place in his cathedral, but was refused. He died the same year, at Liege, aged 55, a martyr to the ignorance and superstition of the age, and to his own blind confidence in favourites and mistresses.

HENRY IV. king of France (in 1589) and Navarre, justly styled *the Great*, was the son of Anthony de Bourbon, chief of the branch of Bourbon, (so called from a sieve that name which fell to them by marriage with the heiress of the estate). His mother was the daughter of Henry de Albert, king of Navarre; a woman of a masculine genius; intrepid, simple and rustic in her manners, but deeply versed in politics, and a zealous protestant. Foreseeing that her party would want such a protector (for her husband was a weak indolent prince), she undertook the care of the education of the young hero: his diet was coarse; his clothes neat, but plain; he always went bare-headed; she sent him to school with the other children of the same age, and accustomed him to climb the rocks and neighbouring mountains, according to the custom of the country. He was born in 1553; and in 1569, the 16th year of his age, he was declared the Defender and Chief of the Protestants at Rochelle. The peace of St Germain, concluded in 1570, recalled the lords in the Protestant interest to court; and in 1572 Henry was married to Margaret de Valois, sister to Charles IX. king of France. It was in the midst of the rejoicings for these nuptials, that the horrid massacre of Paris took

Henry.

took place. Henry was reduced, by this infernal stroke of false policy, to the alternative of changing his religion or being put to death : he chose the former, and was detained prisoner of state three years. In 1587, he made his escape; put himself at the head of the Huguenot party; exposing himself to all the risks and fatigues of a religious war, often in want of the necessaries of life, and enduring all the hardships of the common soldier : but he gained a victory this year at Courtras, which established his reputation in arms, and endeared him to the Protestants. On the death of Henry III. religion was urged as a pretext for one half of the officers of the French army to reject him, and for the leaguers not to acknowledge him. A phantom, the cardinal de Bourbon, was set up against him; but his most formidable rival was the duke de Mayenne: however, Henry, with few friends, fewer important places, no money, and a very small army, supplied every want by his activity and valour. He gained several victories over the duke; particularly that of Ivry in 1590, memorable for his heroic admonition to his soldiers: "If you love your ensigns, rally by my white plume, you will always find it in the road to honour and glory." Paris held out against him, notwithstanding his successes: he took all the suburbs in one day; and might have reduced the city by famine, if he had not humanely suffered his own army to relieve the besieged; yet the bigotted friars and priests in Paris all turned soldiers, except four of the Mendicant order; and made daily military reviews and processions, the sword in one hand and the crucifix in the other, on which they made the citizens swear rather to die with famine than to admit Henry. The scarcity of provisions in Paris at last degenerated to an universal famine; bread had been sold, whilst any remained, for a crown the pound, and at last it was made from the bones of the charnel-house of St Innocents; human flesh became the food of the obstinate Parisians, and mothers eat the dead bodies of their children. In fine, the duke of Mayenne, seeing that neither Spain nor the league would ever grant him the crown, determined to assist in giving it to the lawful heir. He engaged the states to hold a conference with the chiefs of both parties; which ended in Henry's abjuration of the Protestant religion at St Dennis, and his consecration at Chartres in 1593. The following year Paris opened its gates to him; in 1596, the duke of Mayenne was pardoned; and in 1598, peace was concluded with Spain. Henry now shewed himself doubly worthy of the throne, by his encouragement of commerce, the fine arts, and manufactures, and by his patronage of men of ingenuity and sound learning of every country: but though the fermentations of Romish bigotry were calmed, the heaven was not destroyed; scarce a year passed without some attempt being made on this real father of his people; and at last the monster Ravillac stabbed him to the heart in his coach, in the streets of Paris, on the 14th of May 1610, in the 57th year of his age and 22d of his reign.

HENRY VIII. king of England, was the second son of Henry VII. by Elizabeth the eldest daughter of Edward IV. He was born at Greenwich, on the 28th of June 1491. On the death of his brother Arthur, in 1502, he was created prince of Wales;

and the following year betrothed to Catharine of Aragon, prince Arthur's widow, the Pope having granted a dispensation for that purpose. Henry VIII. acceded to the throne, on the death of his father, the 22d of April 1509, and his marriage with Catharine was solemnized about two months after. In the beginning of his reign he left the government of his kingdom entirely to his ministers; and spent his time chiefly in tournaments, balls, concerts, and other expensive amusements. We are told that he was so extravagant in his pleasures, that, in a very short time, he entirely dissipated 1,800,000*l.* which his father had hoarded. This will seem less wonderful, when the reader is informed, that gaming was one of his favourite diversions. Nevertheless he was not so totally absorbed in pleasure, but he found leisure to sacrifice, to the resentment of the people, two of his father's ministers, Empson and Dudley. A house in London, which had belonged to the former of these, was in 1510 given to Thomas Wolsey, who was now the king's almoner, and who from this period began to insinuate himself into Henry's favour. In 1513, he became prime minister, and from that moment governed the king and kingdom with absolute power. In this year Henry declared war against France, gained the battle of Spurs, and took the towns of Terouenne and Tournay; but before he embarked his troops, he beheaded the earl of Suffolk, who had been long confined in the tower. In 1521, he sacrificed the duke of Buckingham to the resentment of his prime minister Wolsey, and the same year obtained from the Pope the title of *Defender of the Faith*.

Henry, having been 18 years married, grew tired of his wife, and in the year 1527 resolved to obtain a divorce; but after many fruitless solicitations, finding it impossible to persuade the Pope to annul his marriage with Catharine, he espoused Ann Bullen in the year 1531. During this interval his favourite Wolsey was disgraced, and died; Henry threw off the Papal yoke, and burnt three Protestants for heresy. In 1535, he put to death Sir Thomas More, Fisher, and others, for denying his supremacy, and suppressed all the lesser monasteries.

His most sacred majesty, having now possessed his second queen about five years, fell violently in love with lady Jane Seymour. Ann Bullen was accused of adultery with her own brother, and with three other persons: she was beheaded the 19th of May, 1536. He married Jane Seymour the day following. In 1537, he put to death five of the noble family of Kildare, as a terror to the Irish, of whose disloyalty he had some apprehensions; and in the year following he executed the marquis of Exeter, with four other persons of distinction, for the sole crime of corresponding with cardinal Pole. In 1538 and 1539, he suppressed all the monasteries in England, and seized their revenues for his own use. The queen having died in childbed, he this year married the princess Ann of Cleves; but disliking her person, immediately determined to be divorced; and his obsequious parliament and convocation unanimously pronounced the marriage void, for reasons too ridiculous to be recited: but this was not all; Henry was so incensed with his minister and quondam favourite, Cromwell, for negotiating this match, that he revenged himself

Henry.

by the hand of the executioner. Yet this was not the only public murder of the year 1540. A few days after Cromwell's death, several persons were burnt for denying the king's supremacy, and other articles of heresy.

His majesty being once more at liberty to indulge himself with another wife, fixed upon Catharine Howard, niece to the duke of Norfolk. She was declared queen in August 1540; but they had been privately married some time before. Henry, it seems, was so entirely satisfied with this lady, that he daily blessed God for his present felicity; but that felicity was of short duration: he had not been married above a year, before the queen was accused of frequent prostitution, both before and since her marriage: she confessed her guilt, and was beheaded in February 1542. In July 1543, he married his sixth wife, the Lady Catharine Parr, the widow of John Nevill lord Latimer, and lived to the year 1547, without committing any more flagrant enormities: but finding himself now approach towards dissolution, he made his will; and, that the last scene of his life might resemble the rest, he determined to end the tragedy with the murder of two of his best friends and most faithful subjects, the duke of Norfolk, and his son the earl of Surrey. The earl was beheaded on the 19th of January; and the duke was ordered for execution on the 29th, but fortunately eluded by the king's death on the 28th. They were condemned without the shadow of a crime; but Henry's political reason for putting them to death, was his apprehension, that, if they were suffered to survive him, they would counteract some of his regulations in religion, and might be troublesome to his son. Henry died on the 28th of January 1547, in the 56th year of his age, and was buried at Windsor.

As to his character, it is pretty obvious from the facts above related. Lord Herbert palliates his crimes, and exaggerates what he calls his *virtues*. Bishop Burnet says, "he was rather to be reckoned among the great than the good princes." He afterwards acknowledges, that "he is to be numbered among the ill princes;" but adds, "I cannot rank him with the worst." Sir Walter Raleigh, with infinitely more justice, says, "If all the pictures and patterns of a merciless prince were lost to the world, they might again be painted to the life out of the history of this king." He was indeed a merciless tyrant, a scurvy politician, a foolish bigot, a horrible assassin. See ENGLAND, n° 212—230.

HENRY of Huntingdon, an English historian, of the 12th century, was canon of Lincoln, and afterwards archdeacon of Huntingdon. He wrote, 1. A history of England, which ends with the year 1154. 2. A continuation of that of Bede. 3. Chronological tables of the kings of England. 4. A small treatise on the contempt of the world. 5. Several books of epigrams and love-verses. 6. A poem on herbs; all which are written in Latin.—His invocation of Apollo and the goddesses of Tempe, in the exordium of his poem on herbs, may not be unacceptable as a specimen of his poetry.

Vatum magnæ parant, herbarum Phœbe reperto,
Vosque, quibus parcant Tempe juvosa Deæ!
Si mihi ferat prius hedera forente parafitis,
Ecce meos flores, ferat parante fero.

HENRY of Susa, in Latin, de Seguso, a famous civilian and canonist of the 13th century, acquired such reputation by his learning, that he was called the *source and splendor of the laws*. He was archbishop of Emburn about the year 1258, and cardinal bishop of Ostia in 1262. He wrote *A summary of the canon and civil laws*; and *A commentary on the book of the decretals*, composed by order of Alexander IV.

HENRY (Philip), a pious and learned nonconformist minister, was the son of Mr John Henry, page of the back-stairs to James duke of York, and was born at Whitehall in 1631. He was admitted into Westminster school at about 12 years of age; became the favourite of Dr Busby, and was employed by him, with some others, in collecting materials for the Greek grammar he afterwards published. From thence he removed to Christ-church, Oxford; where, having obtained the degree of master of arts, he was taken into the family of judge Puleston, at Emeral in Flintshire, as tutor to his sons, and to preach at Worthenbury. He soon after married the only daughter and heiress of Mr Daniel Matthews of Broad-oak near Whitchurch, by whom he became possessed of a competent estate. When the king and episcopacy were restored, he refused to conform, was ejected, and retired with his family to Broad-oak; here, and in the neighbourhood, he spent the remainder of his life, about 28 years, relieving the poor, employing the industrious, instructing the ignorant, and exercising every opportunity of doing good. His moderation in his nonconformity was eminent and exemplary; and upon all occasions he bore testimony against uncharitable and schismatical separation. In church-government he wished for archbishop Usher's reduction of episcopacy. He thought it lawful to join in the common-prayer in public assemblies; which, during the time of his silence and restraint, he commonly attended with his family, with reverence and devotion.

HENRY (Matthew), an eminent dissenting minister and author, was the son of the former, and was born in the year 1662. He continued under his father's care till he was 18 years of age; in which time he became well skilled in the learned languages, especially in the Hebrew, which his father had rendered familiar to him from his childhood; and from first to last the study of the scriptures was his most delightful employment. He completed his education in an academy kept at Islington by Mr Doolittle, and was afterwards entered in Gray's-Inn for the study of the law; where he became well acquainted with the civil and municipal law of his own country, and from his application and great abilities it was thought he would have become very eminent in that profession. But at length, resolving to devote his life to the study of divinity, in 1686 he retired into the country, and was chosen pastor of a congregation at Chester, where he lived about 25 years, greatly esteemed and beloved by his people. He had several calls from London, which he constantly declined; but was at last prevailed upon to accept an unanimous invitation from a congregation at Hackney. He wrote, 1. Expositions of the Bible, in 5 vols. folio. 2. The life of Mr Philip Henry. 3. Directions for daily communion with God. 4. A method for prayer. 5. Four discourses against vice and immorality. 6. The communicant's companion. 7. Family hymns. 8. A scrip-

Hepar
||
Hepatica.

scriptural catechism; and, 9. A discourse concerning the nature of schism. He died of an apoplexy at Nantwich, when upon a journey, in 1714; and was interred at Trinity-church, in Chester.

HEPAR SULPHURIS, or LIVER of SULPHUR, a combination of alkaline salt and sulphur. See CHEMISTRY, n° 321—325.

By means of the fume arising on the decomposition of *hepar sulphuris* by an acid, Mr Bergman hath found a method of imitating the hot or sulphureous mineral waters, to as great perfection as the cold ones are now imitated by fixed air. The process consists simply in adding the vitriolic acid to *hepar sulphuris*, and impregnating water with the peculiar species of air that arises from this mixture; in the same manner as when water is impregnated with the fixed air arising from the mixture of that or any other acid with chalk. This *hepatic air*, as the author calls it, is very readily absorbed by water; to which it gives the smell, taste, and all the other sensible qualities of the sulphureous waters. A Swedish *cantharus* of distilled water, containing 12½ Swedish cubic inches, will absorb about 60 cubic inches of this hepatic air; and on dropping into it the *nitrous acid*, it will appear, that a real sulphur is contained, in a state of perfect solution, in this water, to the quantity of eight grains. It does not appear that any other acid, except what the author calls the *dephlogisticated marine acid*, will produce this effect.—When any particular sulphureous water is to be imitated, we scarce need to observe, that the saline, or other contents peculiar to it, are to be added to the artificial *hepatic water*. Instead of the liver of sulphur, the operator may use a mixture of three-parts of filings of iron and two-parts of sulphur melted together.

It may, perhaps, be thought, that water thus prepared, does not differ from that in which a portion of the *hepar sulphuris* has been dissolved: but it appears evidently to differ from it in this material circumstance;—that in the solution of *hepar sulphuris*, the sulphur is held in solution by the water, through the means of the *alkali* combined with it: whereas, in M. Bergman's process, it does not appear probable that the *hepar sulphuris* rises substantially in the form of air; for, in that case, its presence in the hepatic water might be detected by means of the weakness of the acids (even the *phlegmic*), which would precipitate the sulphur from it. Nor can it be supposed that any portion or constituent part of the *alkali* itself (except a part of its remaining fixed air) can come over. The water, therefore, must owe its impregnation to the sulphur, raised, in some peculiar manner, into the state of an elastic vapour; permanent, when the experiment is made in quicksilver; but condensable in water, and rendered soluble in that fluid through the means of some unknown principle combined with it, and which the author supposes to be the matter of heat, combined with it through the medium of *phlogiston*.

HEPATIC, in medicine and anatomy, any thing belonging to the liver.

HEPATIC Air. See *HEPAR SULPHURIS*.

HEPATIC Aloes, the inspissated juice of a species of *ALOES*.

HEPATIC Water. See *HEPAR SULPHURIS*.

HEPATICA, in botany, a species of *ANEMONE*.

HEPATITIS, in medicine, an inflammation of the liver. See (the *Index* subjoined to) *MEDICINE*.

HEPHÆSTIA, in Grecian antiquity, an Athenian festival in honour of Vulcan, the chief ceremony of which was a race with torches. It was performed in this manner: The antagonists were three young men, one of whom, by lot, took a lighted torch in his hand, and began his course; if the torch was extinguished before he finished the race, he delivered it to the second: and he in like manner to the third: the victory was his who first carried the torch lighted to the end of the race; and to this successive delivering of the torch, we find many allusions in ancient writers.

HEPTACHORD, in the ancient poetry, signified verses that were sung or played on seven chords, that is, on seven different notes. In this sense it was applied to the lyre when it had but seven strings. One of the intervals is also called an *heptachord*, as containing the same number of degrees between the extremes.

HEPTAGON, in geometry, a figure consisting of seven sides, and as many angles. In fortification, a place is termed an *heptagon*, that has seven bastions for its defence.

HEPTAGONAL NUMBERS, in arithmetic, a sort of polygonal numbers, wherein the difference of the terms of the corresponding arithmetical progression is 5. One of the properties of these numbers is, that if they be multiplied by 40, and 9 be added to the product, the sum will be a square number.

HEPTANDRIA, in botany, (from *ἑπτα*, *septem*, and *ἄνδρα*, *a man*;) the seventh class in Linnæus's sexual method, consisting of plants with hermaphrodite flowers, which have seven flamina, or male-organs. The orders are four, derived from the number of styles or female-organs.

HEPTANGULAR, in geometry, an appellation given to figures which have seven angles.

HEPTARCHY, a government of seven persons; also a state or country divided into seven kingdoms, and governed by seven independent princes; in which sense it is particularly applied to the government of South-Britain, when divided among the Saxons. See ENGLAND, n° 43.

HERACLEA, an ancient city of Turkey in Europe, and in Romania, with the see of an archbishop of the Grecian church, and a sea-port. It was a very famous place in former times, and there are still some remains of its ancient splendor. Theodore Lascaris took it from David Comnenus, emperor of Trebizond; when it fell into the hands of the Genoese, but Mahomet II. took it from them; since which time it has been in the possession of the Turks. It is near the sea. E. Lon. 27. 48. N. Lat. 40. 27.

HERACLEONITES, a sect of Christians, the followers of Heracleon, who refined upon the Gnostic divinity, and maintained that the world was not the immediate production of the Son of God, but that he was only the occasional cause of its being created by the demiurgus. The Heracleonites denied the authority of the prophecies of the Old Testament, maintaining that they were mere random sounds in the air; and that St John the Baptist was the only true voice that directed to the Messiah.

HERACLEUM, *MADNESS*; a genus of the digynia order,

Hepatitis
||
Heracleum

order, belonging to the pentandria class of plants. -- There are five species, of which the most remarkable is the *Spondylium*, or cow-parfip. This is common in many parts of Britain, and other northern parts of Europe and Asia. -- Gmelin, in his *Flora Siberica*, p. 214, tells us, that the inhabitants of Kamtschatka, about the beginning of July, collect the foot-stalks of the radical leaves of this plant, and, after peeling off the rhind, dry them separately in the sun, and then, tying them in bundles, dry them carefully in the shade: in a short time afterwards, these dried stalks are covered over with a yellow saccharine efflorescence, tasting like liquorice; and in this state they are eaten as a great delicacy. -- The Russians not only eat the stalks thus prepared, but procure from them a very intoxicating spirit. They first ferment them in water with the greater bilberries, (*vaccinium uliginosum*), and then distill the liquor to what degree of strength they please; which Gmelin says is more agreeable to the taste than spirits made from corn. This may therefore prove good succedaneum for whisky; and prevent the consumption of much barley, which ought to be applied to better purposes. -- Swine and rabbits are very fond of this plant. In the county of Norfolk it is called *bog-weed*.

HERACLIDÆ, in antiquity, the descendants of Hercules. The Heraclidæ were expelled from Peloponnesus, by Euristheus king of Mycenæ, after the death of Hercules.

Return of the HERACLIDÆ into Peloponnesus, is a celebrated epocha in the ancient chronology. -- The time of this return is differently assigned; by reason authors mistake the divers attempts they made to return, for the return itself. The first attempt was 20 years before the taking of Troy: the second was 100 years later, or 80 years after the taking of Troy. This last is supposed to have succeeded; at least, according to Petavius, who mentions only these two. Scaliger distinguishes three attempts; and fixes the first 50 years later than Petavius, viz. 30 years after the taking of Troy. He says nothing of the second, which was unfortunate like the first; but places the third in the same year with Petavius. As it occasioned a world of changes and revolutions in the affairs of Greece, inasmuch that scarce a state or people but were turned upside down thereby, the return of the Heraclidæ is the epocha of the beginning of profane history: all the time that preceded it is reputed fabulous. Accordingly, Ephorus, Cumanus, Callisthenes, and Theopompus, only begin their histories from hence.

HERACLIDES of PONTUS, a Greek philosopher, the disciple of Speusippus, and afterwards of Aristotle, flourished about 336 B. C. His vanity prompted him to desire one of his friends to put a serpent into his bed just as he was dead, in order to raise a belief that he was ascended to the heavens among the gods; but the cheat was discovered. All his works are lost.

HERACLITUS, a famous Ephesian philosopher, who flourished about the 69th Olympiad, in the time of Darius Hytaspes. He is said to have continually

bewailed the wicked lives of men, and, as often as he came among them, to have fallen a-weeping; contrary to Democritus, who made the follies of mankind a subject of laughter. He retired to the temple of Diana, and played at dice with the boys there; saying to the Ephesians who gathered round him, "Worshippers of men, what do ye wonder at? Is it not better to do thus than to govern you?" Darius wrote to this philosopher to come and live with him; but he refused the offer: at last, out of hatred to mankind, he retired to the mountains, where he contracted a dropsy by living on herbs, which destroyed him at 60 years of age. His writings gained him so great reputation, that his followers were called *Heraclitians*. Laertius speaks of a treatise upon nature, divided into three books, one concerning the universe, the second political, the third theological, which he deposited in the temple of Diana.

HERACLIUS, emperor of the east, a renowned warrior, died A. D. 641. He carried on long and bloody wars with the Saracens, by whom he was almost always defeated. See ARABIA, n° 67--93.

HERALD, says Verstegan, is derived from the Saxon word *Herehault*, and, by abbreviation, *Heral*, which in that language signifies the champion of an army; and, growing to be a name of office, it was given to him who, in the army, had the special charge to denounce war, to challenge to battle and combat, to proclaim peace, and to execute martial messages. But the business of heralds with us is as follows, viz. To marshal, order, and conduct all royal calvacades, ceremonies at coronations, royal marriages, installations, creations of dukes, marquises, earls, viscounts, barons, baronets, and dubbing of knights; embassies, funeral processions, declarations of war, proclamations of peace, &c.: To record and blazon the arms of the nobility and gentry; and to regulate any abuses therein 'till the English dominions, under the authority of the Earl-Marshal, to whom they are subservient. The office of Windsor, Chester, Richmond, Somerset, York, and Lancaster heralds, is to be assistants to the kings at arms, in the different branches of their office; and they are superior to each other, according to creation, in the above order.

Heralds were formerly held in much greater esteem than they are at present; and were created and christened by the king, who, pouring a cold-cup of wine on their head, gave them the herald-name: but this is now done by the earl-marshal. They could not arrive at the dignity of herald without having been seven years purfuitant; nor could they quit the office of herald, but to be made king at arms.

The office and dignity of a herald was first instituted by Ancus Martius, fourth king of the Romans, as Livy declares; but some writers ascribe its origin to Numa Pompilius, and that he ordained a college of heralds. Richard III. was the first who formed them, in this kingdom, into a college; and afterwards great privileges were granted them by Edward VI. and Philip and Mary.

Heraclides
Herald.

HERALDRY,

Definition
origin, &c.
of Heraldry.

A SCIENCE which teaches how to blazon, or explain in proper terms, all that belongs to coats-of-arms; and how to marshal, or dispose regularly, divers arms on a field. It also teaches whatever relates to the marshalling of solemn calvacades, processions, and other public ceremonies at coronations, installations, creations of peers, nuptials, christening of princes, funerals, &c.

Arms, or coats-of-arms, are hereditary marks of honour, made up of fixed and determined colours and figures, granted by sovereign princes, as a reward for military valour, a shining virtue, or a signal public service; and which serve to denote the descent and alliance of the bearer, or to distinguish states, cities, societies, &c. civil, ecclesiastical, and military.

Thus heraldry is the science, of which *arms* are the proper object; but yet they differ much both in their origin and antiquity. Heraldry, according to Sir George Mackenzie, "as digested into an art, and subjected to rules, must be ascribed to Charlemagne and Frederick Barbarossa, for it did begin and grow with the feudal law." Sir John Ferne is of opinion, that we did borrow *arms* from the Egyptians; meaning, from their hieroglyphicks. Sir William Dugdale mentions, that arms, as marks of honour, were first used by great commanders in war, necessity requiring that their persons should be notified to their friends and followers. The learned Alexander Nisbet, in his excellent system of heraldry, says, that arms owe their rise and beginning to the light of nature; and that signs and marks of honour were made use of in the first ages of the world, and by all nations, however simple and illiterate, to distinguish the noble from the ignoble. We find in Homer, Virgil, and Ovid, that their heroes had divers figures on their shields, whereby their persons were distinctly known. Alexander the Great, desirous to honour those of his captains and soldiers who had done any glorious action, and also to excite an emulation among the rest, did grant them certain badges to be borne on their armour, pennons, and banners; ordering, at the same time, that no person or potentate, through his empire, should attempt or presume to give or tolerate the bearing of those signs upon the armour of any man, but it should be a power reserved to himself; which prerogative has been claimed ever since by all other kings and sovereign princes within their dominions.

After these and many other different opinions, all that can be said with any certainty is, that, in all ages, men have made use of figures of living creatures, or symbolical signs, to denote the bravery and courage either of their chief or nation, to render themselves the more terrible to their enemies, and even to distinguish themselves or families, as names do individuals. The famous C. Agrippa, in his treatise of the vanity of sciences, cap. 81. has collected many instances of these marks of distinction, anciently borne by kingdoms and states that were any way civilized, viz.

The Egyptians	} bore	an Ox,
The Athenians		an Owl,
The Goths		a Bear,
The Romans		an Eagle,
The Franks		a Lion,
The Saxons		a Horse.

Hereditary
arms, &c.

The last is still borne in the arms of his present Britannic Majesty. As to hereditary arms of families, William Camden, Sir Henry Spelman, and other judicious heralds, agree, that they began no sooner than towards the latter end of the 11th century. According to Father Menestrier's opinion, a French writer whose authority is of great weight in this matter, Henry l'Oiseleur (the Falconer) who was raised to the imperial throne of the West in 920, by regulating tournaments in Germany gave occasion to the establishment of family-arms, or hereditary marks of honour, which undeniably are more ancient and better observed among the Germans than in any other nation. Moreover, this last author asserts, that with tournaments first came up coats-of-arms; which were a sort of livery, made up of several lills, fillets, or narrow pieces of stuff of divers colours, from whence came the fess, the bend, the pale, &c. which were the original charges of family-arms; for they who never had been at tournaments, had not such marks of distinction. They who insisted themselves in the Croisades, took up also several new figures hitherto unknown in armorial ensigns; such as alerions, bezants, escalop-shells, martlets, &c. but more particularly crosses, of different colours for distinction's sake. From this it may be concluded, that heraldry, like most human inventions, was insensibly introduced and established; and that, after having been rude and unsettled for many ages, it was at last methodised, perfected, and fixed, by the Croisades and tournaments.

These marks of honour are called *arms*, from their being principally and first worn by military men at war and tournaments, who had them engraved, embossed, or depicted on shields, targets, banners, or other martial instruments. They are also called *coats-of-arms*, from the custom of the ancients embroidering them on the coats they wore over their arms, as heralds do to this day.

Arms are distinguished by different names, to denote the causes of their bearing; such as,

A R M S

Of Dominion,	Of Patronage,
Of Pretension,	Of Family,
Of Concession,	Of Alliance,
Of Community,	Of Succession.

Arms of *dominion* or sovereignty are those which emperors, kings, and sovereign states, do constantly bear; being, as it were, annexed to the territories, kingdoms, and provinces, they possess. Thus the three lions are the arms of England, the fleurs-de-lis those of France, &c.

Arms of *pretension* are those of such kingdoms, pro-

Different
forts of
Arms.

Of the
Shield, &c.

provinces, or territories, to which a prince or lord has some claim, and which he adds to his own, although the said kingdoms or territories be possessed by a foreign prince or other lord. Thus the kings of England have quartered the arms of France with their own, ever since Edward III. laid claim to the kingdom of France, which happened in the year 1330, on account of his being son to Isabella, sister to Charles the Handsome, who died without issue.

Arms of *concession* or augmentation of honour, are either entire arms, or else one or more figures, given by princes as a reward for some extraordinary service. We read in history, that Robert Bruce, king of Scotland, allowed the earl of Winton's ancestor to bear, in his coat-armour, a crown supported by a sword, to shew that he, and the clan Scaton, of which he was the head, supported his tottering crown. The late Queen Anne granted to Sir Cloudesly Shovel, rear-admiral of Great Britain, a chevron between two fleurs-de-lis in chief, and a crescent in base, to denote three great victories he had gained; two over the French, and one over the Turks.

Arms of *community*, are those of bishoprics, cities, universities, academies, societies, companies, and other bodies corporate.

Arms of *patronage*, are such as governors of provinces, lords of manors, patrons of benefices, &c. add to their family-arms, as a token of their superiority, rights, and jurisdiction. These arms have introduced into heraldry, castles, gates, wheels, ploughs, rakes, harrows, &c.

Arms of *family*, or *paternal-arms*, are those that belong to one particular family, that distinguish it from others, and which no person is suffered to assume without committing a crime, which sovereigns have a right to restrain and punish.

Arms of *alliance*, are those which families, or private persons, take up and join to their own, to denote the alliances they have contracted by marriage. This sort of arms is either impaled, or borne in an *escutcheon of pretence*, by those who have married themselves.

Arms of *succession*, are such as are taken up by them who inherit certain estates, manors, &c. either by will, entail, or donation, and which they either impale or quarter with their own arms; which multiplies the titles of some families out of necessity, and not through ostentation, as many imagine.

These are the eight classes under which the divers sorts of arms are generally ranged; but there is a sort which blazoners call *assumptive arms*, being such as are taken up by the caprice or fancy of upstarts, though of ever so mean extraction, who, being advanced to a degree of fortune, assume them without a legal title. This, indeed, is a great abuse of heraldry; and common only in Britain, for on the continent no such practice takes place.

We now proceed to consider the essential and integral parts of arms, which are these:

The ESCUTCHEON, The CHARGES,
The TINCTURES, The ORNAMENTS.

C H A P. I.

Of the SHIELD or ESCUTCHEON.

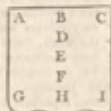
THE *Shield*, or *Escutcheon*, is the field or ground whereon are represented the figures that make up a

coat of arms: for these marks of distinction were put on bucklers or shields, before they were placed on banners, standards, flags, and coat-armour; and wherever they may be fixed, they are still on a plane or superficies, whose form resembles a shield.

Shields, in heraldry called *escutcheons*, or *feutcheons*, from the Latin word *feutum*, have been, and still are, of different forms, according to different times and nations. Amongst ancient shields, some were almost like a horse-shoe, such as is represented by n^o 1. in the figure of Escutcheons; others triangular, somewhat rounded at the bottom, as n^o 2. The people who inhabited Mesopotamia, now called *Diarbeck*, made use of this sort of shield, which, it is thought, they had of the Trojans. Sometimes the shield was heptagonal, that is, had seven sides, as n^o 3.—The first of this shape is said to have been used by the famous triumvir M. Antony. That of knights-banneret was square, like a banner, as n^o 4. As to modern escutcheons, those of the Italians, particularly of ecclesiastics, are generally oval, as n^o 5. The English, French, Germans, and other nations, have their escutcheons formed different ways, according to the carver's or painter's fancy; see the various examples contained from n^o 6—16 of the figure. But the escutcheon of maids, widows, and of such as are born ladies, and are married to private gentlemen, is in the form of a lozenge. See n^o 17—20. Sir George Mackenzie mentions one Muriel, countess of Strathern, who carried her arms in a lozenge, anno 1284, which shews how long we have been versant in heraldry.

Armourists distinguish several parts or points in escutcheons, in order to determine exactly the position of the bearings they are charged with; they are here denoted by the first nine letters of the alphabet, ranged in the following manner:

- A—the dexter chief.
- B—the precise middle chief.
- C—the sinister chief.
- D—the honour point.
- E—the fess point.
- F—the navril point.
- G—the dexter base.
- H—the precise middle base.
- I—the sinister base.



The knowledge of these points is of great importance, and ought to be well observed, for they are frequently occupied with several things of different kinds. It is necessary to observe, that the dexter-side of the escutcheon is opposite to the left hand, and the sinister side to the right hand of the person that looks on it.

C H A P. II.

Of TINCTURES, FURS, LINES, and DIFFERENCES.

SECT. I. Of Tinctures.

By *tinctures* is meant that variable hue of arms which is common both to shields and their bearings. According to the French heralds, there are but seven tinctures in armory; of which two are metals, the other five are colours.

The Metals are,
Gold, } termed { Or.
Silver, } { Argent.
20 M 2

The

The
Tinctures.

The Colours are

Blue,	} termed {	<i>Azure.</i>
Red,		<i>Gules.</i>
Green,		<i>Vert.</i>
Purple,		<i>Purpure.</i>
Black,		<i>Sable.</i>

When natural bodies, such as animals, plants, celestial bodies, &c. are introduced into coats of arms, they frequently retain their natural colours, which is expressed in this science by the word *proper*.

Besides the five colours abovementioned, the English writers on heraldry admit two others, viz.

Orange,	} termed {	<i>Tenny.</i>
Blood-colour,		<i>Sanguine.</i>

But these two are rarely to be found in British bearings.

These tinctures are represented in engravings and drawings (the invention of the ingenious Silvester Petra Sancta, an Italian author of the last century), by dots and lines, as in fig. ii. n^o 1—9.

Or is expressed by dots.

Argent needs no mark, and is therefore plain.

Azure, by horizontal lines.

Gules, by perpendicular lines.

Vert, by diagonal lines from the dexter chief to the sinister-base points.

Purpure, by diagonal lines from the sinister-chief to the dexter-base points.

Sable, by perpendicular and horizontal lines crossing each other.

Tenny, by diagonal lines from the sinister-chief to the dexter-base points, traversed by horizontal lines.

Sanguine, by lines crossing each other diagonally from dexter to sinister, and from sinister to dexter.

Sir George Mackenzie observes, that "some fantastic heralds have blazoned not only by the ordinary colours and metals, but by flowers, days of the week, parts of a man's body, &c. and have been condemned for it by the heralds of all nations. "Yet the English have so far owned this fancy," (the most judicious of them, as Mr Cartwright and others, reprobate it as absurd,) "that they give it for a rule, that the coats of sovereigns should be blazoned by the planets, those of noblemen by precious stones; and have suited them in the manner here set down:

" Or	Topaz	Sol
" Argent	Pearl	Luna
" Sable	Diamond	Saturn
" Gules	Ruby	Mars
" Azure	Sapphire	Jupiter
" Vert	Emerald	Venus
" Purpure	Amethyst	Mercury
" Tenny	Jacinth	Dragon's-head
" Sanguine	Sardonix	Dragon's-tail.

"But I crave leave to say, that these are but mere fancies, and are likewise unfit for the art, for these reasons: 1st, The French (from whom the English derive their heraldry, not only in principles, but in words of the French language,) do not only not use these different ways of blazoning, but treat them *en ridicule*. 2^{dly}, The Italian, Spanish, and Latin heralds use no such different forms, but blazon by the ordinary metals and colours. 3^{dly}, Art

The Furs.

"should imitate nature; and as it would be an unnatural thing in common discourse not to call red *red*, because a prince wears it, so it is unnatural to use these terms in heraldry, and it may fall out to be very ridiculous in some arms; for instance, if a prince had for his arms an *asi couchant* under his burden *gules*, how ridiculous would it be to say he had an *asi couchant Mars*?—A hundred other examples might be given; but it is enough to say, that this is to confound colours with charges, and the things that are borne with colours. 4^{thly}, It makes the art unpleasant, and deters gentlemen from studying it, and strangers from understanding what our heraldry is; nor could the arms of our princes and nobility be translated in this disguise into Latin or any other language. But that which convinces most that this is an error is, because it makes that great rule unnecessary, whereby colour cannot be put upon colour, nor metal upon metal; but this cannot hold but where metals and colours are expressed."

The English heralds give different names to the roundlet (n^o 10), according to its colour. Thus, if it is

Or,	} it is called a {	<i>Bezant.</i>
Argent,		<i>Plate.</i>
Azure,		<i>Hurt.</i>
Gules,		<i>Torteau.</i>
Vert,		<i>Pomey.</i>
Purpure,		<i>Golpe.</i>
Sable,		<i>Pellet.</i>
Tenny,		<i>Orange.</i>
Sanguine,		<i>Guze.</i>

The French, and all other nations, do not admit such a multiplicity of names to this figure; but call them *Bezants*, after an ancient coin struck at Constantinople, once *Byzantium*, if they are Or and Torteaux; if of any other tincture, expressing the same.

SECT. II. Of Furs.

Furs represent the hairy skin of certain beasts, prepared for the doublings or linings of robes and garments of state; and as shields were anciently covered with furred skins, they are therefore used in heraldry not only for the linings of the mantles, and other ornaments of the shields, but also in the coats of arms themselves.

There are three different kinds in general use, viz.

1. *Ermine*; which is a field argent, powdered with black spots, their tails terminating in three hairs. (Fig. ii. n^o 11.)

2. *Counter-ermine*, where the field is sable, and the powdering white. (n^o 12.)

3. *Vair* (n^o 15.), which is expressed by blue and white skins, cut into the forms of little bells, ranged in rows opposite to each other, the base of the white ones being always next to that of the blue ones. *Vair* is usually of six rows; if there be more or fewer, the number ought to be expressed; and if the colours are different from those abovementioned, they must likewise be expressed.

The English multiply the furs, as well as the names of the tinctures, though no other nation has adopted such varieties. Thus they give us,

1. *White*, which is the natural colour of the ermine; but

Of Lines. but it is used on no other occasion but in the descriptions of mantles.

2. *Ermines*, which is the same with contra-ermine.

3. *Ermineois*; the field is Or, the powdering Sable, (n^o 13.). For the use of this fur Guillim cites Bara, p. 14. but no such fur is to be found in Bara.

4. *Pean*; the field is Sable, the powdering Or, (n^o 14.) The French use no such term; but they call all furs or doublings *des pannes*, or *pennes*, which term has possibly given rise to this mistake, and many others, in those who do not understand the French language.

5. *Erminites*; the same as Ermine, with the addition of a red hair on each side of the black. Sir Geo. Mackenzie calls these distinctions "but fancies, for "Erminites signifies properly little Ermines."

6. *Counter-vair*; when the bells of the same tincture are placed base against base, and point against point, (n^o 16.).

7. *Potent-counter-potent*, anciently called *Vairy-cuppy*, as when the field is filled with crutches or potents counter-placed, (n^o 17.).

It may not be improper to observe, that the use of the tinctures took its rise from the several colours used by warriors whilst they were in the army, which S. de Petra Sancta proves by many citations. And because it was the custom to embroider gold and silver on silk, or silk on cloth of gold and silver, the heralds did therefore appoint, that in imitation of the clothes so embroidered, colour should never be used upon colour, nor metal upon metal.

SECT. III. Of the Lines used in the Parting of Fields.

ESCUTCHEONS are either of one tincture, or more than one: those that are of one only, that is, when some metal, colour, or fur, is spread all over the surface or field, such a tincture is said to be predominant. But in such as have on them more than one, as most have, the field is divided by lines, which, according to their divers forms, receive various names.

Lines may be either straight or crooked. Straight lines are carried evenly through the escutcheon; and are of four different kinds, viz. a perpendicular line, |; a horizontal, —; a diagonal dexter, \; a diagonal sinister, /.

Crooked lines are those which are carried unevenly through the escutcheon with rising and falling. French armorists reckon 11 different sorts of them; Guillim admits of seven only; but there are 14 distinct kinds, the figures and names of which are as in fig. i. (A), n^o 1—14. viz.

1. The engrailed. 2. The invected. 3. The wavy. 4. The embattled, or crenelle. 5. The nebule. 6. The raguly. 7. The indented. 8. The dancette. 9. The dove-tail. 10. The grafted. 11. The embattled a-ronde. 12. The battled embattled. 13. The patee or dove-tail. 14. Champaine.

The principal reason why lines are thus used in heraldry, is to difference bearings which would be otherwise the same; for an escutcheon charged with a chief engrailed, differs from one charged with a chief

wavy, as much as if the one bore a cross and the other a saltier.

As the forementioned lines serve to divide the field, it must be observed, that if the division consists of two equal parts made by the perpendicular-line, it is called *parted per pale*; by the horizontal-line, *parted per fess*; by the diagonal-dexter, *parted per bend*; by the diagonal-sinister, *parted per bend-sinister*; examples of which will be given in the sequel of this treatise.

If a field is divided into four equal parts by any of these lines, it is said to be *quartered*, which may be done two ways, viz.

Quartered or parted *per cross*; which is made by a perpendicular and horizontal line, which, crossing each other at the centre of the field, divide it into four equal parts called *quarters*. See Plate CXLIV. under fig. i. (A).

Quartered or parted *per saltier*; which is made by two diagonal lines, dexter and sinister, that cross one another in the centre of the field, and likewise divide it into four equal parts. *Ibid.*

The escutcheon is sometimes divided into a greater number of parts, in order to place in it the arms of the several families to which one is allied; and in this case it is called a *genealogical achievement*. These divisions may consist of 6, 8, 12, and 16, quarters, [as under fig. i. (A.)] and even sometimes of 20, 32, 64, and upwards; there being examples of such divisions frequently exhibited at pompous funerals. An extraordinary instance of this kind was lately exhibited at the pompous funeral of the late worthy viscounts Townshend, whose corps was brought from Dublin castle in Ireland, to Rainham-hall in Norfolk, one of the principal tenants on horseback carrying before the hearse a genealogical banner, containing the quarterings of his lordship's and her ladyship's family, to the amount of upwards of 160 coats. Sir George Booth, the present-rector of the valuable living of Ashton under Line, bears six distinct coats-of-arms in his shield, viz. those for Booth, Barton, Venables, Mountfort, Ashton, Egerton; and has besides a right to 37 other coats: but Sir William Dugdale very justly objects to so many arms being clustered together in one shield or banner, on account of the difficulty of discerning and knowing asunder one coat-of-arms from another.

SECT. IV. Of the Differences of Coats-of-Arms.

ARMORISTS have invented divers differences, or characteristic marks, whereby bearers of the same coat-of-arms are distinguished each from others, and their nearness to the principal bearer demonstrated. According to J. Guillim, these differences are to be considered either as ancient or modern.

ART. I. OF ANCIENT DIFFERENCES.

THOSE he calls *ancient differences* consist in *bordures* (A); which is a bearing that goes all round, and parallel to the boundary of the escutcheon, in form of a hem, and always contains a fifth part of the field in breadth. Bordures were used in ancient times for the distinguishing not only of one nation or tribe from another, but also to note a diversity between particular persons descended of one family and from the same parents.

(A) Bordures are still introduced into English coats-of-arms, but for particular reasons, which heralds can best explain. They are by the French frequently taken for a principal figure, and numbered among the rest of the ordinaries.

Ancient
Differences.Ancient
Differences.

parents. This distinction, however, was not expressly signified by unvariable marks; nor were bordures always appropriated to denote the different degrees of consanguinity: for, as Sir Henry Spelman observes in his *Alphesia*, p. 140, ancient heralds, being fond of peripetuous differences, often inverted the paternal tincture, or sometimes inserted another charge in the escutcheon, such as bends, crozets, cantons, or the like; which irregularity has, I suppose, induced modern armorists to invent and make use of others."

There are bordures of different forms and tinctures, as in the examples, fig. iii.

N^o 1. is "Sable, a Bordure Argent;" borne by the right hon. Sackville Tufton, Earl of Thanet.—When a bordure is plain, you are not to mention it, as it is always understood so in heraldry, though it be not expressed; but if it has any other form, you are to signify it.

2. "Gules, a Bordure engrailed Argent;" borne by the right hon. Charles Gray, lord Gray.—This is called *engrailed*, from the French word *engrêlé*, which signifies a thing the hail has fallen upon and broken off the edges, leaving it with little semicircles struck out of it.

3. "Gules, a Bordure engrailed Or;" borne by the right hon. George Talbot, earl of Shrewsbury.—You must observe, that, in a bordure or ordinary formed of these lines, the points are represented on all sides towards the field, and the semicircles turned towards the bordure or ordinary.

4. "Argent, a Bordure indented Azure."—This is quite contrary to the last; for, as the other turns its points from the bordure into the field, so contrarywise this does; by the inversion of the points from the field into the bordure. Such a charge, or any other formed of these lines, is seldom to be met with in English coats-of-arms.

5. "Gules, a Bordure indented Argent."—The word *indented* requires very little explanation, the signification being obvious to all persons, from its figure, which is composed of tracis resembling teeth, called in Latin *dentes*.

6. "Azure, a Bordure Ermine."

7. "Vert, a Bordure Vair."

8. "Ermine, a Bordure compony, or gobony, Or and Sable."—This is so termed from its being composed of small and equal pieces. J. Guillim calls this bordure *gabonated*, which implies the same meaning; but the word being obsolete, is not used by modern heralds.

9. "Quarterly, Azure and Gules, a Bordure compony Argent and Azure;" borne by his grace Henry Somerset, duke of Beaufort, &c.

10. "Azure, a Bordure counter-compony Argent and Gules."—Observe, that the counter-compony does always consist of two tracis, and no more.

11. "Or, a Bordure chequy Argent and Sable."—This has a great resemblance with the last bordure, having only one tract more; therefore you must take care, before you blazon, to number them, or else you may easily err in taking the one for the other.

12. "Gules, a Bordure Argent charged with eight Trefoils slipped proper, that is, Vert."—All nations use few terms in blazoning bordures; but English armorists, in order, possibly, to raise the dignity of this

science, have perplexed it, and rendered it unintelligible to all foreigners, by introducing into it several mythical names, among which may be reckoned the following ones, viz. They call a bordure, if charged with eight plants, fruits, flowers, or leaves, *verdoy* of such vegetables; or *enlauron* of such birds, *enmury* of beasts, *perlesow* of furs, and *entoyre* of inanimate things of what kind soever.

13. "Gules on a Bordure Azure, eight Stars Or."

14. "Argent, a Bordure compony of the last and Gules, the first charged with Roses of the second, barbed and seeded proper."—This bordure is borne by his grace Charles Lennox, duke of Richmond, &c.

15. "Ermine, within a Bordure engrailed Gules;" the coat-of-arms of the right hon. Henry-Benedict Barnewall, viscount Kingsland, &c. of Ireland.—This ancient and noble family is of French extraction, and allied to the dukes of Little-Bretagne, where the name continues still in great repute.

16. "Argent, a Bordure Sable charged with eight Bescants;" borne by the right hon. ——— Cole, lord Ranelagh, of Ireland.

17. "Party per pale Argent and Gules, a Bordure charged with eight Escalops counterchanged;" the coat-of-arms of the right hon. William Maule, earl of Panmure, &c. of Ireland. This very ancient family is originally French, and derives its surname from the town and lordship of Maule in Normandy, where the same arms are still to be seen in the parish-church.

18. "Azure, a Bordure quarterly, the first and fourth Ermine, the second and third counter-compony Argent and Azure."

19. "Purpure, a Bordure compony Or and Gules, each of the last charged with a Bescant."

20. "Quarterly Or and Gules, within a Bordure Vert, charged with eight Escalops Or."

We shall conclude this head with observing, that a bordure is never of metal upon metal, and seldom of colour upon colour, but rather of the tincture which the principal bearing or charge is of. Thus Sir ——— Dalziel of Glenae, whose predecessor was a younger brother of the noble family of Carnwath, has, within a Bordure Argent, the paternal coat of the ancient name of Dalziel, viz. "Sable, a hanged man with his arms extended, Argent;" formerly they carried him hanging on a gallows. This bearing, though so very singular for a coat-of-arms, was given as a reward to one of the ancestors of the late Robert Dalziel, earl of Carnwath, to perpetuate the memory of a brave and hazardous exploit performed in taking down from a gallows the body of a favourite and near relation of king Kenneth II. hung up by the Picts, which story is thus related by Alexander Nisbett: "The king being exceedingly grieved that the body of his minion and kinsman should be so disgracefully treated, he proffered a great reward to any of his subjects who would adventure to rescue his corpse from the disgrace his cruel enemies had unjustly put upon it: but when none would undertake this hazardous enterprise, at last a valorous gentleman came and said to the king, *Dalziel*, which signifies, "I dare;" and he did actually perform that noble exploit to the king's satisfaction and his own immortal honour, and in memory of it got the aforesaid remarkable bearing; and afterwards his posterity took the word *Dalziel* for their surname, and the

Plate
CXLV.

Fig. 4. (A).

HERALDRY.

Fig. 1. (B)
ESCUTCHEONS.

LINE DIFFERENCES, &c.

N^o 1. Engrailed

20 The Grafted

9 The Devotail

2. Inverted.

3. The Barry.

4. The Embattled

5. The Abole.

6. The Ragule.

7. The Indented.

8. The Lancette

11. The Embattled aronde

32 Battled Embattled

13 The Grafted

11 The Champagne

1. Label?

2. Crescent.

3. Mallet.

4. Martlet.

5. Escut.



6. The Rose.

7. Rose.

8. Orbs. Holm.

9. Quarterfoil.



Quarterfoil per Orbs.

Quarterfoil per Orbs.

Genealogical Achievement?

Gyron.



Quarter

Quarter

Quarter

Quarter



Orbs.

Quarterfoil.

Quarterfoil.

Quarterfoil.



Muscle.

Rustre.

Gyronny.



Fig. 2.
TINCTURES.



Modern
Differences

the interpretation of it, *I dare*, continues even to this day to be the motto of that noble family." We can have no better proof of the truth of this tradition than this, that the heads of this ancient family have, for many ages, carefully retained this bearing without any alteration or addition.

ART. 2. OF MODERN DIFFERENCES.

The modern differences, which the English have adopted, not only for the distinguishing of sons issued out of one family, but also to denote the difference and subordinate degrees in each house from the original ancestors, are nine, viz.

Plate
CXLIV.
under fig. i.
(A.)

For the heir or first son, the Label. 2d son, the Crescent. 3d son, the Mullet. 4th son, the Martlet. 5th son, the Annulet. 6th son, the Flower-de-luce. 7th son, the Rose. 8th son, the Cross-moline. 9th son, the Double Quarter-foil.

By these differences, the six sons of Thomas Beauchamp, the 15th earl of Warwick, who died in the 34th year of king Edward III. are distinguished in an old window of the church of St Mary at Warwick; so that although they are called *modern differences*, their usage with the English is ancient.

It must be observed, that, of all the forementioned marks of distinction, none but the label is affixed on the coats-of-arms belonging to any of the royal family; which the introducers of this peculiarity have, however, thought proper to difference by additional pendants and distinct charges on them.

Plate
CXLV.

As to the distinction to be made in the arms of the offspring belonging to each of the above-mentioned brothers, it is expressed by figures on the top and margin of the table contained in fig. iv. For instance, The heir or first son of the second house, beareth a crescent charged with a label during his father's life only. The second son of the second house, a crescent charged with another crescent. The third son of the second house, a crescent charged with a mullet. The fourth son of the second house, a crescent charged with a martlet. The fifth son of the second house, a crescent charged with an annulet. The sixth son of the second house, a crescent charged with a flower-de-luce; and so on of the other sons, taking care to have them of a different tincture.

In what part of the escutcheon these differences should be borne is not certain; for Guillim, Morgan, and others, give us many different examples of their position. The honour-point would be the properest place, if the arms would admit of it; but that is not always the case, as that part may be charged with some figure in the paternal coat, which cannot with propriety receive the difference. There are instances where these are borne as perfect coats of arms, as the examples subjoined to the Table of Houses sufficiently shew, which are to be blazoned thus:

The first is "Azure, a Label argent."—When such a label is borne as a difference, the pendants, according to G. Leigh, signify that he is but the third person; the dexter pendant referring to his father, the sinister to his mother, and the middle one to himself.

The second is "Argent, a Label of five points Azure;" borne by the name of Hentington. If a label has more or less than three pendants or points,

they are to be expressed as in the foregoing example.

The third is "Azure, a Crescent argent," borne by the name of Lucy.—The reason G. Leigh assigns for the second son's having a crescent for a difference, is to shew that he should increase the family by adding to it riches and reputation.

The fourth is "Argent, a Mullet Sable, on a Chief Azure, a Fleur-de-lis Or;" borne by the name of Rogers, in Gloucestershire.—A mullet or spur was appointed for the third son's difference, as the last-mentioned author says, to shew that he should follow chivalry.

The fifth is "Azure, a Fleur-de-lis Argent;" borne by the Right-hon. Henry Digby, baron Digby of Gresham, in King's county, Ireland.

These few examples, among many more that might be given, demonstrate the impropriety of adopting these *modern differences*, as they are called, for marks of cadency to distinguish the different branches of a family: for it is impossible to distinguish the uncle or grand-uncle, from the nephew or grand-nephew, if each of them are second, third, or fourth sons; and in the course of succession these differences would multiply to such a number, that it would be impossible to delineate them distinctly in most cases. But as they are given by most of the English writers on heraldry, though no foreign nation uses them, it was thought proper to insert them here.

Sisters, except of the blood-royal, have no other mark of difference in their coats-of-arms, but the form of the escutcheon, (as observed before); therefore they are permitted to bear the arms of their father, even as the eldest son does after his father's decease. The reason of which is by Guillim said to be, that when they are married, they lose their surname, and receive that of their husbands.

Next to these diminutions G. Leigh, J. Guillim, and after them Dr Harris in his *Lexicon Technicum*, set forth at large divers figures, which they pretend were formerly added to the coats of such as were to be punished and branded for cowardice, fornication, slander, adultery, treason, or murder, for which they give them the name of *abatements of honour*; but as they produce but one instance of such whimsical bearings, we have not inserted them here. Besides, arms, being marks of honour, they cannot admit of any note of infamy; nor would anybody now-a-days bear them, if they were so branded. It is true, a man may be degraded for divers crimes, particularly high treason; but in such cases the escutcheon is reversed, trod upon, and torn in pieces, to denote a total extinction and suppression of the honour and dignity of the person to whom it belonged.

C H A P. III.

Of the CHARGES.

ARMORISTS call a charge whatsoever is contained in the field, whether it occupy the whole, or only a part thereof. All charges are distinguished by the names of *honourable ordinaries*, *sub-ordinaries*, and *common charges*.

Honourable ordinaries, the principal charges in heraldry, are made of lines only, which, according to their

Modern
Differences

Honourable
Ordinaries.

their disposition and form, receive different names. Sub-ordinaries are ancient heraldic figures frequently used in coats-of-arms, and which are distinguished by terms appropriated to each of them.

Common charges are composed of natural, artificial, and even chimerical things, such as planets, creatures, vegetables, instruments, &c.

SECT. I. Of Honourable Ordinaries.

THE most judicious armorsmiths admit only of nine honourable ordinaries, viz.

The Chief	The Bar
The Pale	The Chevron
The Bend	The Crois
The Bend sinister	and
The Fels	The Saltier.

Of these, but six have diminutives, which are called as follows: That of the chief is a *fillet*: The pale has a *pallet* and *endorse*; the bend, a *bendlet*, *cofs*, and *ribband*: The bend-sinister has the *scarpe* and *bâton*; the bar, the *closet* and *barulet*; the chevron a *chevronel* and *couple-cloze*. All which shall be treated of in order.

ART. I. Of the CHIEF.

THE chief is an ordinary determined by an horizontal line, which, if it is of any other form but straight, must be expressed. It is placed in the upper part of the escutcheon, and containeth in depth the third part of the field. Its diminutive is a *fillet*, the content of which is not to exceed one fourth of the chief, and standeth in the lowest part thereof. This ordinary is subject to be charged with variety of figures; and may be indented, wavy, nebule, &c. as in the examples, fig. v.

Plate
CXLV.

N^o 1. is "Or, a Chief indented Azure;" borne by the right hon. Edmund Butler, viscount Mountgarret, &c. of the kingdom of Ireland. This great and illustrious family of the Butlers, so renowned for the many valiant and loyal persons it has produced, is descended from the ancient counts of Brion in Normandy; but since king Henry II. conferred the office of chief butler of Ireland upon one of the family, he and his successors have assumed the name of *Butler*.

2. "Azure a Chief engrailed Or."
3. "Argent, a Chief invected Vert."
4. "Vert, a Chief undy Or."
5. "Azure, a Chief nebule Argent."
6. "Or, a Chief chequy Azure and Argent."
7. "Ermine, a Chief quarterly Or and Gules;" borne by the name of Peckham.

8. "Argent, a Chief Sable, in the lower part thereof a Fillet of the Field."

9. "Azure, fretty Argent, a Chief Or;" borne by the right hon. Hayes St Leger, viscount Doneraile, &c. of the county of Cork in Ireland. This ancient and noble family is of French extraction; and is descended from Sir Robert Sent Legère, knight, who, in 1066, accompanied William duke of Normandy in his expedition into England; and the family have a tradition, that he, with his own hand, supported the said duke when he quitted the ship to land in Suffex.

10. "Argent, on a Chief engrailed Azure, a Tortoise passant Or;" borne by the name of *Bidgood*.

11. "Argent, on a Chief Gules, two Spur-revels Or;" borne by the right hon. John St John, lord St John of Blethoe, &c. Of this ancient family, which derive their surname from a place called *St John* in Normandy, was John de St John, Esq. who having a principal employment in the army of the Norman duke, attended him in his expedition into England.

12. "Argent, on a Chief Vert, two Spears Heads erect of the Field, the points imbrued Gules;" borne by the Right Hon. George Brodrick, Viscount Midleton, &c. of the kingdom of Ireland. This family is lineally descended from George de Brodrick, who came into England in the reign of William II.

13. "Or, on a Chief Sable, three Escalops of the field;" for the name of *Graham*; and borne quartered in the arms of his Grace William Graham, duke, marquis, and earl of Montrose, &c. with Argent three Roses Gules. According to the Scots writers, this great and noble family is descended from the renowned Grame or Grame, who, in the year 404, was general of king Fergus II.'s army, and, in 420, forced his way through the wall built by the Romans between the rivers Forth and Clyde to keep out the Scots from molesting them in their possessions, and the said breach has ever since been called *Grame's dike*.

14. "Argent, on a Chief indented Gules, three Crofses pattee of the Field;" borne by the right hon. John Perceval, earl of Egmont, &c. This very ancient and noble family is supposed, from circumstances little short of positive proof, to have sprung from a younger branch of the sovereign dukes of Bretagne in France, of the same name. They were transplanted into Normandy before the conquest, possessed of great estates and power, and invested with the office of chief butler. Upon the Norman invasion, two of this family came over into England with the Conqueror, from one of which the descent of the present earl of Egmont is deduced by the clearest and most indisputable proofs of historians and records.

15. "Azure, on a Chief indented Or, three Spur-revels Gules;" borne by the right hon. Charles Moore, earl of Drogheda, &c. of the kingdom of Ireland. This noble family, which is of French extraction, came into England soon after the conquest, and made their first residence in the manor of Moore-court, in the county of Kent.

16. "Ermine, on a Chief indented Azure, three ducal coronets Or;" borne by the name of *Lyton*.

17. "Azure, on a Chief Or, three Martlets Gules;" for the name of *Wray*; and borne by Sir Cecil Wray, Bart. of Lincolnshire.

18. "Ermine, on a Chief Gules; five Lozenges of the first;" borne by the name of *Dixin*.

19. "Argent, fretty Gules, on a Chief of the second, three Leopard's Faces Or;" borne by the right hon. Henry Liddel, lord Ravenworth. This noble lord is descended from the ancient lords of Liddlecaille, in the county of Durham, where they have been proprietors of great-coal-mines time out of mind.

20. "Ermine, a Chief party per pale Azure and Or; on the dexter the Sun in its splendor, on the sinister a Crois pattee Gules." The arms of the bishopric of Raphoe, in the kingdom of Ireland.

ART.



Fig. 4.
TABLE of HOUSES.

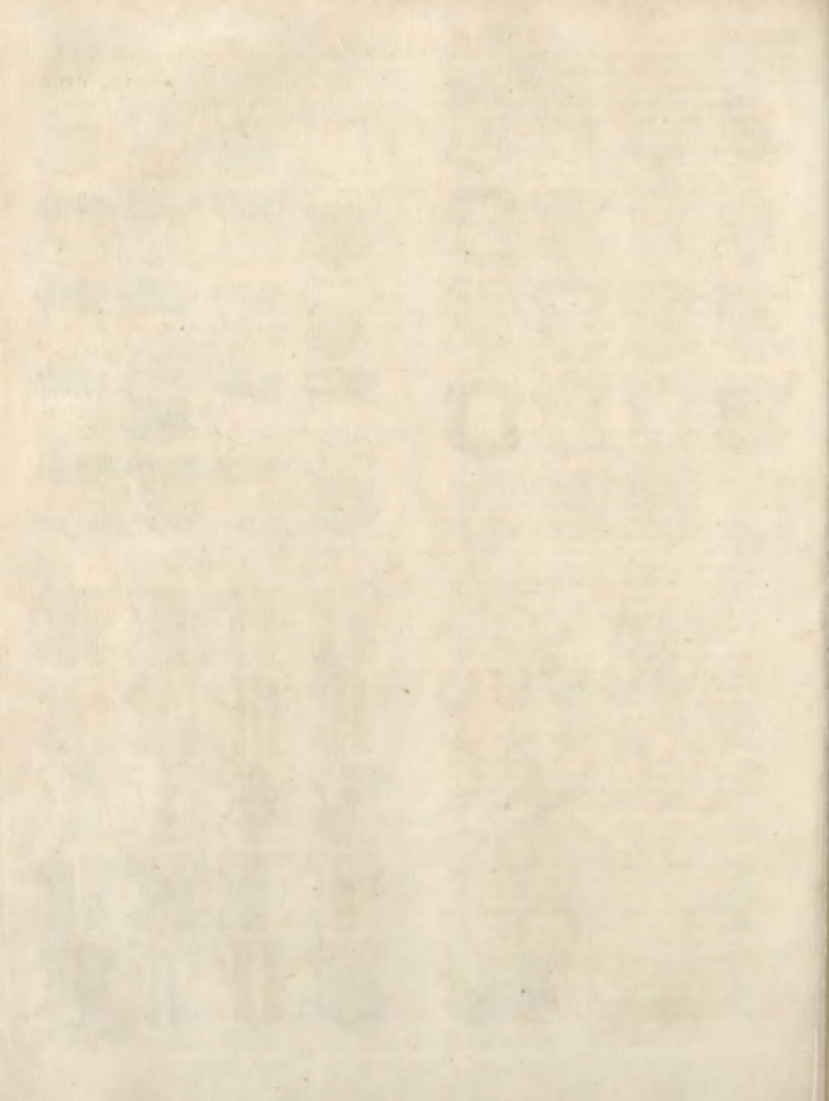


Fig. 5.
CHIEFS &c.



Fig. 6.
PALES &c.





Of the
Pale.

Of the
Bend.

ART. II. Of the PALE.

THE Pale is an ordinary, consisting of two perpendicular lines drawn from the top to the base of the Escutcheon, and contains the third middle part of the field. Its diminutives are, The pallet, which is the half of the pale; and the endorfe, which is the fourth part of a pale. This ordinary and the pallet may receive any charge, but the endorfe should not be charged. The endorfe, besides, is never used, according to J. Leigh, but to accompany the pale in pairs, as cotices do the bend; but Sir John Ferne is of a different opinion.

EX. 1. "Gules, a Pale Or;" by the name of *Grand-main*.

2. "Party per Pale Argent and Gules, a Pale counterchanged."

3. "Argent, a Pale between two Endorfes Gules."

4. "Party per Pale, 1/3, Paly of fix Argent and Sable, 2d, Azure;" borne by the name of *Trenchard*.

5. "Paly of fix Or and Azure."

6. "Argent, three Pallets undy Sable;" by the name of *Downer*.

7. "Party per Pale, Argent and Gules;" borne by the right hon. John Waldegrave, earl Waldegrave, &c. This noble earl is descended from John de Waldegrave, who was sheriff of London in the year 1205, in the seventh year of king John.

8. "Party per Pale indented, Or and Gules;" borne by the right hon. Thomas Bermingham, baron of Athenry, in the kingdom of Ireland. Of this ancient and noble family, which are of English extraction, and took their name from the town of Bermingham in the county of Warwick, was William de Bermingham, who was possessed of the town of that name in the reign of Henry II. which continued in that family till the reign of Henry VIII.

9. "Quarterly per Pale dove-tail, Gules and Or;" borne by the right hon. Thomas Bromley, lord Montfort, &c. This noble lord is maternally descended from Sir Walter Bromleghe, of Bromleghe, in the county of Stafford, who flourished in the reign of king John. Sir Thomas Bromley, another of his lordship's ancestors, was constituted lord high chancellor of England, 21 Elizabeth; in which post he died, 29 Elizabeth.

10. "Argent, a Pale fretty counterfairy Sable."

11. "Argent, a Pale lozengy Sable;" borne by the name of *Savage*.

12. "Argent, a Pale indented Vert;" borne by the name of *Dixon*.

13. "Argent, on a Pale engrailed Sable, three Crescents Or;" borne by the name of *Afley*.

14. "Ermine, on a Pale engrailed azure, three Lion's Heads couped Or;" borne by the name of *Avery*.

15. "Vert, on a Pale radiant Or, a Lion rampant Sable;" borne by the right hon. James O'Hara, lord Tyrawley, &c. in the kingdom of Ireland. This noble lord is descended from Milesius king of Spain, by his eldest son Hiberius, who, with his brother Heremon, established a colony in Ireland. Sir Charles O'Hara, father to the present lord, was created baron of Tyrawley by queen Anne, Jan. 10. 1706, being at that time a lieutenant-general, and colonel of the

Vol. V.

royal regiment of fusileers: and the next year was made general in Spain, where this son, lord James, was wounded at the battle of Almanza.

16. "Azure, a Pallet Argent."

17. "Vert, an Endorfe Or."

18. "Argent, on two Pallets Sable, six Crofs-croffets fitchy Or;" borne by the name of *Belunes*, of the county of Salop.

19. "Argent, two Endorfes Gules, in Chief three Mulletts Sable;" borne by the name of *Vautort*.

20. "Azure, on a Pale walled with three pieces on each side Or, an Endorfe Sable;" borne by the name of *Sublet de Noyers*, a family of distinction in France.

ART. III. Of the BEND and BEND-SINISTER.

THE Bend is an ordinary formed by two diagonal lines, drawn from the dexter-chief to the sinister-base; and contains the fifth part of the field in breadth, if uncharged; but if charged, then the third. Its diminutives are, The bendlet, which is the half of a bend; the coft or cotice, when two of them accompany a bend, which is the fourth part of a bend; and the riband, the moiety of a coft, or the eighth part of the field.

There is also the bend-sinister, which is of the same breadth as the bend, but drawn the contrary way: this is subdivided into a scarpe, which is the half of the bend, and into a bâton, which is the fourth part of the bend, but does not extend itself to the extremities of the field, there being part of it seen at both ends. See the examples, fig. vii.

EX. 1. "Argent, a Bend wavy Sable;" borne by the right hon. John Wallop, earl of Portsmouth, &c. This noble earl is descended from the Wallops of Hampshire, a Saxon family, who were possessed of lands to a considerable value in the county at the time of the conquest.

2. "Checky Or, and Azure, a Bend Ermine;" borne by the right hon. John Ward, viscount Dudley and Ward, &c. The ancestors of this noble lord were anciently of the county of Norfolk, of which was Simon Ward, who had large possessions in the reign of Edward I. and was in France and Scotland in the reigns of king Edward II. and III.

3. "Azure, a Bend engrailed Argent, between two Cotices Or;" borne by the right hon. Matthew Fortescue, lord Fortescue, as also by the right hon. Hugh Fortescue-Aland, baron Fortescue, in the kingdom of Ireland, this last nobleman bearing a crescent in his arms for difference. The family of Fortescue is descended from Sir Richard le Forte, a person of extraordinary strength and courage, who accompanied William duke of Normandy in his invasion of England; and bearing a strong shield before the duke, at the battle of Hastings, had three horses killed under him, and from that signal event the name and motto of the family were assumed; for the Latin word *scutum*, or the old French word *esue* (a shield) being added to *forte* (strong), compose their name; and the motto is, *Fortescutum salus ducum*.

4. "Sable, a Bend Argent between two Cotices indented Or;" borne by the name of *French*.

5. "Paly of fix Or and Sable, a Bend counterchanged;" borne by the right hon. Frederick Calvert, baron Baltimore. The original of this family is from an ancient and noble house of that surname in the earl-

20 N

dom

Plate
CXLV.
fig. vi.

Plate
CXLVI.

Of the
Bend, &c.The Fess
and Bar.

dom of Flanders, whereof Sir George Calvert, knight, among other honourable employments, was secretary of state to king James I. by whom he was created a baron, Feb. 20. 1624, and from whom he had a grant to him, and his heirs, of the province of Maryland and Avalon in America.

6. "Party per Bend crenelle Argent and Gules;" borne by the right hon. Edmund Boyle, earl of Cork and Orrery, &c. in the kingdom of Ireland. This noble lord is said to be descended from Sir Philip Boyle, a knight of Arragon, who, in the reign of king Henry VI. tilted at a tournament with Sir Joseph Atkley, knight of the Garter.

7. "Argent, three Bendlets *enhanfed* Gules," as the English express it, but the phrase *enhanfed* is used by no other nation. The proper blazon of this arms is, Parted per bend, 1st bendy of six gules, and argent; 2d of the last. Borne by the right hon. William Byron, lord Byron. From Doomsday-book it appears, that this family was possessed of numerous manors and lands in the reign of the Conqueror; and that Sir John Byron, one of his lordship's ancestors, attended king Edward III. in his wars in France.

8. "Ermine, a Bend voided Gules;" borne by the name of *Ireton*.

9. "Argent three Bendlets wavy Azure;" borne by the name of *Wilbraham*.

10. "Bendy of six pieces Argent and Azure". Observe, that when the field is filled with an equal number of bendlets of metal and colour, it is called *bendy*; but if the number of them is unequal, they are to be blazoned by the name *bendlets*, and their number specified.

11. "Party per Bend Azure and Argent, two Bendlets engrailed counterchanged;" borne by the name of *Frenee*.

12. "Quarterly, Or and Gules, a Bend over-all Vair;" borne by his grace Lionel Cranfield Sackville, duke of Dorset and earl of Middlesex, &c. The ancestors of this family were lords of the town and feignory of Sackville in Normandy, and came over with the Conqueror when he invaded England in 1066.

13. "Gules on a Bend Argent, three Trefoils slipped proper;" borne by the right hon. George William Hervey, earl of Bristol, &c. This noble lord derives his pedigree from Robert Fitz-Hervey, a younger son of Hervey duke of Orleans, who came over from France with William the Conqueror.

14. "Argent, on a bend Gules cotised Sable, three pairs of Wings conjoined of the first;" borne by the right hon. Richard Wingfield, viscount Powerscourt, in the kingdom of Ireland. This noble lord is denominated from the manor of Wingfield in Suffolk, where they had a feat before the Norman conquest, called *Wingfield-castle*.

15. "Gules, on a Bend contre Ermine cotised Or, three Boars Heads couped Argent;" borne by the right hon. George Edgcumbe, lord Edgcumbe, &c. The ancestors of this noble lord received their name from the manor of Edgcumbe in Devonshire. One of this lord's ancestors was Sir Richard Edgcumbe, who came over to England with the earl of Richmond, having a great share in the victory he obtained over king Richard III. at Bosworth, by which the earl made his way to the throne of England.

16. "Argent, a Bend-sinister Gules."

17. "Or, a Bendlet Gules."

18. "Argent, a Ribband Gules.—The name of this bearing corresponds well with its form, being both long and narrow, which is the shape of a ribband.

19. "Azure, a Scarpe Or."—This bearing, as Guillim observes, is that kind of ornament called now a-days a *Scarf*, which is used by officers on duty, and usually worn after the same manner.

20. This contains three Batons. The first is comonly ermine and azure; set over the royal arms, for his grace William Fitzroy duke of Cleveland. The second is comonly argent and azure; set over the royal arms, for his grace Augustus Henry Fitzroy, duke of Grafton. The third is Gules, charged with three roses argent, seeded and barbed proper; set over the royal arms, for his grace George Beauclerk, duke of St Albans. The grandfathers of these noble dukes being natural fons of king Charles II. is what entitles them to the royal arms.

ART. IV. Of the Fess and Bar.

THE Fess is an ordinary which is produced by two parallel lines drawn horizontally across the centre of the field, and contains in breadth the third part thereof. Some English writers say it has no diminutive, for the bar is a distinct ordinary of itself.

The Bar, according to their definition, is formed of two lines, and contains but the fifth part of the field: which is not the only thing wherein it differs from the fess; for there may be more than one in an escutcheon, placed in different parts thereof, whereas the fess is limited to the centre-point; but in this the French differ from them. The bar has two diminutives: the *barulet*, which contains the half of the bar; and the *clofet*, which is the half of the barulet. When the shield contains a number of bars of metal and colour alternate, of even number, that is called *barry* of so many pieces, expressing their number. See the examples, Fig. viii.

N^o 1. is "Argent, a Fess indented Sable;" borne Plate by the right hon. John Weir, earl Delawarr, &c. This CXLVI. noble family is descended from the Weirs, a great family in the west of England; but in the reign of Edward II. they appear to have been seized of manors and lands in the county of Warwick. Sir Thomas de Weir, knight, one of his lordship's ancestors, being at the battle of Cressly, and there taking John the French king prisoner, had granted him, for that remarkable action, an augmentation to his achievement, viz. a crampette or, distinguished by the chape of a sword in the middle; the chape being given him by the said king, as an acknowledgment of his becoming his prisoner: his cognizance was a rose parted per pale, argent, and gules; which two badges are still borne in the achievement of the present lord Delawarr.

2. "Argent, a Fess wreathed Azure and Gules;" borne by the right hon. John Carmichael, earl of Hyndford. Of this ancient family, which is said to assume their surname from the lands of Carmichael, in the county of Lanark, in Scotland, where they still have their chief seat, was Sir John Carmichael, who accompanied Archibald, earl of Douglas, to the assistance

The Fefs
and Bar.

The Fefs
and Bar.

affluence of Charles VI. of France, againſt the Engliſh; and ſignalizing his valour at the battle of Baughey in April 1421, and breaking his ſpear when the French and Scots got the victory, had thereupon added to his paternal coat, a dexter arm holding a broken ſpear, which is now the creſt of the family.

3. "Party per Fefs Or and Argent, a Fefs nebule Gules;" borne by the name of *Antefeld*.

4. "Party per Fefs indented Or and Azure;" borne by the name of *Saunders*.

5. "Checky Or and Azure on a Fefs Gules, a Creſcent argent for difference;" borne by the right hon. Hugh Clifford, lord Clifford, of Chudley. This noble lord is deſcended from Walter de Clifford, of Clifford-caſtle, in the county of Hereford, who came over into England with the Conqueror; of which family was fair Roſamond, miſtreſs to king Henry II.

6. "Argent on a Fefs Azure three Lozenges Or;" borne by the right hon. Baſil Fielding, earl of Denbigh and Deſmond, &c. This noble earl is deſcended from the earls of Hapsburg, in Germany. Geoffrey earl of Hapsburg, being oppreſſed by Rodolph emperor of Germany, came over into England, and one of his ſons ſerved king Henry III. in his wars, whoſe anceſtors laying claim to the territories of Lauffenburg and Rhin-Filding, in Germany, he took the name of *Fielding*.

7. "Or, on a Fefs Gules, three Fleur-de-lis of the firſt;" borne by the name of *Lennard*. This is in the firſt and fourth quarters of the right hon. Thomas Barret Lennard lord Dacre's arms.

8. "Ermine, on a Fefs Gules, a Lion paſſant Or;" borne by the right hon. John Proby, baron Caryſfort, &c. in the kingdom of Ireland.

9. "Sable, a Fefs Ermine, between three Creſcents Or;" borne by the right hon. George-William Coventry, earl of Coventry, &c. This noble earl is deſcended from John Coventry, a native of the city of Coventry, and afterwards mercer and lord mayor of London, in the reign of Henry V.; from whom deſcended Thomas Coventry, one of the juſtices of the court of common-pleas, in the reign of queen Elizabeth; whoſe fon Thomas was recorder of London, and afterwards lord keeper of the great ſeal in the reign of king Charles I.

10. "Sable, a Fefs checky, Or and Azure, between three Beſants;" borne by the right hon. Ridgeway Pitt, earl and baron of Londonderry, &c." Of this noble family, which were anciently of Bandſort, in the county of Dorſet, was Thomas Pitt, eſq; who, in the reign of Queen Anne, was made governor of fort St George in the Eaſt Indies, where he reſided many years, and purchaſed a diamond, which he fold to the king of France for 125,000l. Sterling, weighing 136 carats, and commonly known at this day by the name of *Pitt's diamond*.

11. "Or, on a Fefs Sable, between three Muſcovy Ducks proper, a Roſe of the Field;" borne by the right hon. John Bateman, viſcount Bateman, &c. Of this noble family, which was anciently ſeated at Halebrook, near St Omers in Flanders, was Giles Bateman, eſq; whoſe fon was a merchant of London, and was father to Sir James Bateman, knight, who, in 1712, was choſen member of parliament for Ilcheſter in the county of Somerſet, and re-choſen in 1713.

12. "Sable, on a Fefs Argent, between three Leopards paſſant guardant Or, three Eſcalops Gules;" borne by the right hon. Wills Hill, earl of Hillsborough, &c. Of this family, which, in the reign of Queen Elizabeth, were of note in the county of Downe, was Sir Moſes Hill, who, during O'Neill's rebellion, was one of thoſe gentlemen who ſociated under the earl of Eſſex to ſuppreſs it; and afterwards ſerved under Arthur, lord Chicheſter, lord deputy, and by king James I. was appointed provost-mariſhal of the whole province of Ulſter in Ireland.

13. "Gules, two Bars Or;" borne by the right hon. Simon Harcourt, earl of Harcourt, &c. This noble earl is deſcended from the Harcourts of Normandy, who took their name from a place called *Harcourt*, in that province, where the family uſually reſided. Gervaiſe, count de Harcourt, with his two ſons Jeffrey and Arnold, came over with the conqueror, when he invaded England, in 1066.

14. "Ermine, two Bars Gules;" borne by the right hon. Thomas Nugent, earl of Weiſtmeath, and baron Delvin.

15. "Argent, two Bars indented Sable;" borne by the right hon. Godart Ginkle, earl of Athlone. Godart, who was the firſt earl, was deſcended of a very ancient family in the united provinces of Holland, where he was baron de Reede and Ginkle, &c. In 1691, he was a lieutenant-general of king William's forces in Ireland; where, in June the ſame year, he took Ballymore for the Engliſh; and, in July following, the Iriſh town of Athlone, which laſt exploit is one of the greateſt recorded in hiſtory.

16. "Argent, three Bars gemels Gules;" borne by the right hon. Richard Barry, earl of Barrymore, &c. This noble family, who have been renowned for their loyalty and valour, are ſaid to derive their ſurname from the iſland of Barry, in the county of Glamorgan, in Wales; and from their riches and eſtates have been called by the people *Barrymore*, or the Great Barry.

17. "Or, a Fefs-couped Gules, between two Lions paſſant Sable;" borne by the right hon. Samuel Maſham, lord Maſham, &c. This noble lord is deſcended from Sir John Maſham, who flouriſhed in the reign of king Henry VI. and was buried at Thorneham, in the county of Suffolk, in 1455.

18. "Argent, a Lion rampant guardant Gules, debruſed by a Fefs Azure, between three Etoiles iſſuing out of as many Creſcents of the ſecond;" borne by the right hon. Robert Dillon, earl of Roſcommon, &c. in the kingdom of Ireland. This noble family is derived from Logan, ſurnamed *Dilune* or *Delion*, which ſignifies brave and valiant, to whom the duke of Aquitaine gave his daughter in marriage, in whole right, after her father's death, he became prince and ſovereign of Aquitaine, which continued in his poſterity till Henry II. married Alionora, daughter and heir to William V. duke of Aquitaine, and about 1172 obtained that principality by ſuperior force; and, to prevent any diſturbance, brought Sir Henry Delion or Dillon, and his brother Thomas, then infants, to England, their father being ſlain.

19. "Or, two Bars Azure, a Chief quarterly of the ſecond and Gules, the 1ſt and 4th charged each with two Fleur-de-lis of France; the 2d and 3d with

a Lion of England;" borne by his grace John Manners, duke of Rutland, marquis of Granby, &c. This chief was anciently Gules; and the charge thereon is an honorary augmentation, shewing his grace's descent from the blood royal of king Edward IV.

20. "Barry of ten pieces Argent and Azure, over all six Escutcheons; 3, 2, 1, Sable, each charged with a Lion rampant of the first, armed, and langued Gules, a Croiscent for difference;" borne by the right hon. James Cecil, earl of Salisbury, &c. This noble earl is descended from the famous *William Cecil* lord Burleigh, statesman in the reigns of Edward VI. and Elizabeth. This great man left two sons, Thomas and Robert, who were both made earls in one day, May 4. 1603. Robert, the younger son, ancestor of the present noble lord, was created earl of Salisbury in the morning; and Thomas, the eldest, earl of Exeter in the afternoon.

ART. V. Of the CHEVERON.

THE Cheveron, which represents two rafters of a house well jointed together, or a pair of compasses half open, takes up the fifth part of the field with the English, but the French give it the third. Its diminutives are, The cheverlon, which contains the half of a cheveron; and the couple-cloze, which is the half of a cheverlon, that is, its breadth is but the fourth part of a cheveron. Leigh observes, that this last diminutive is never borne but in pairs, or with a cheveron between two of them. The French have but one diminution of this ordinary called *Etaie*, containing the third part of its breadth.

Examples of cheverons are given in fig. ix. viz.

1. "Argent, a Cheveron Gules between three Torseaux;" borne by the right hon. Bennet Sherard, earl of Harborough, &c. This noble earl is lineally descended from Scherard, who was possessed of manors and lands to a great value in the counties of Cheshire and Lancashire in the reign of William the Conqueror. Geoffrey, another of this earl's ancestors, was three times sheriff of Rutlandshire, in the reigns of king Edward IV. and king Richard III.

2. "Sable, a Cheveron between three Estoiles Argent;" borne by the right hon. Marmaduke Langdale, lord Langdale. This noble lord is descended from the Langdales of Yorkshire, who resided at the town of Langdale, from whence they took their name, in the reign of king John; but his ancestor, who makes the greatest figure in history, is Sir Marmaduke Langdale, who raised forces in the north of England in defence of king Charles I. was victorious in numberless battles and sieges, and when his Majesty, by the united forces of England and Scotland, was at length overpowered, he attended king Charles II. in his exile, and returned to England with his Majesty at the restoration.

3. "Sable, a Cheveron between three Leopards Heads Or;" borne by the right hon. William Wentworth, earl of Strafford, &c. All genealogists agree, that the name of *Wentworth* is of Saxon original, and taken from the manor of Wentworth in Yorkshire, where, in the reign of William the Conqueror, lived Reginald de Wentworde, as it is spelt in doomsday-book.

4. "Argent, a Cheveron between three Grif-

fons passant Sable, a Croiscent for difference;" borne by the right hon. Hensage Finch, earl of Ailesford, &c. This family is descended from Herbert Fitz-Herbert, earl of Pembroke, and chamberlain to king Henry I. They took the name of *Finch* in the reign of king Edward I. One of the ancestors of the present earl was the right hon. Hensage Finch, earl of Nottingham, who was constituted lord high-chancellor of England in 1675; and lord high-steward on the trials of Philip earl of Pembroke, and William viscount Stafford, in 1680.

5. "Azure, a Cheveron Ermine, between three Escalops Argent;" borne by the right hon. George Townshend, viscount Townshend, &c. This family is of Norman extraction, and came into England about the time of the conquest. Charles, lord viscount Townshend, grandfather of the present viscount, was appointed principal secretary of state in the reign of king George I. in 1720, and continued so to the end of his majesty's reign; when, upon resigning the seals, they were returned to him again by his late majesty king George II. who continued him in that honourable office to the year 1730.

6. "Azure, a Cheveron between three Mulletts Or;" borne by the right hon. John Chetwind, viscount Chetwind, &c. of the kingdom of Ireland. Of this family, which hath been of great antiquity in the county of Salop, taking their surname from Chetwynd in that county, was Adam de Chetwynd, who married Agnes daughter of John lord Lovel, baron of Dockinges, and lord of Minster Lovel in Oxfordshire; and by her had issue Sir John de Chetwynd, who, in the 37th of Henry III. had a charter of free-warren thro' all his demesne in the counties of Salop, Stafford, and Warwick.

7. "Argent, a Cheveron Gules, between three square Buckles Sable;" borne by the right hon. Matthew Ducie-Morton, lord Ducie, &c. This noble lord is descended from the Ducies in Normandy. After they came into England, king Edward I. conferred on them the lordship of Morton in Staffordshire, and several other lordships and manors, which the family enjoyed for many years. Sir Robert Ducie, one of his lordship's ancestors, was lord-mayor of London in the reign of king Charles I. and though he lent his majesty L. 80,000, which was lost by the king's being driven out of London, he died, however, worth L. 400,000.

8. "Argent, a Cheveron Checky Gules, and of the Field, between three Bugle-horns fringed Sable, garnished of the second;" borne by the right hon. lord Hugh Semple, lord Semple. The principal family of this name was Semple of Elliotston in Renfrew, where they had large possessions and offices, as stewards and bailiffs under the family of Stewart, proprietors of that county before they came to the crown. The first lord Semple was Sir Robert, who, being much in favour with king James IV. was by him created lord Semple in 1489.

9. "Argent, a Cheveron engrailed between three Lions passant Sable;" borne by the right hon. and the reverend Philip Smythe, viscount Strangford. One of this lord's ancestors was John Smythe, esq; who acquired a considerable estate whilst he was farmer of the customs in the reign of Henry VIII. He left two sons,

sons, John and Sir Thomas, which last was sent ambassador by king James I. to the emperors of Russia.

10. "Quarterly Argent and Azure, a Cheveron engrailed counter-changed;" borne by the name of *Chamber*.

11. "Party per Cheveron engrailed Gules and Argent, three Talbotts Heads erased counter-changed;" borne by the right hon. Anthony Duncombe, lord Feverham, &c. His lordship is descended from the Duncombes of Barley-end in Buckinghamshire. Sir Charles Duncombe, uncle to the present lord, was lord-mayor of London in 1709; and this nobleman was created lord Feverham and baron of Downton in Wiltshire, June 23, 1744.

12. "Paly of six, Argent and Gules, on a Cheveron Azure, three Crofs-croffets Or;" borne by the right hon. George Carpenter, baron Carpenter, of Killaghy in Ireland. This ancient and noble family are of great antiquity in the county of Hereford, and have been lords of the manor of the Home in the parish of Delwyn, near Weobly, for above 300 years. George, the first lord Carpenter, was so created May 4. 1719.

13. "Azure, on a Cheveron Or, between three Befsants, a Bay Leaf Proper;" borne by the right hon. James Hope, earl of Hopeton, &c. This noble family is descended from Henry Hope, a native of Holland, who, about two centuries ago, came over and settled in Scotland. Charles Hope, esq; father of the present earl, was created an earl by queen Anne, April 15. 1703.

14. "Vert, on a Cheveron between three Unicorns Heads erased Argent, horned and maned Or, three Mulletts Sable;" borne by the name of *Ker*, being the 1st and 4th quarters in the arms of his grace John Ker, duke of Roxburgh, &c. This ancient family is said to come from Normandy. John Ker, marquis of Beaumont and Cesford, the first duke of Roxburgh, was so created April 27. 1707.

15. "Azure, on a Cheveron Or, between three Bears Heads couped Argent, muzzled Gules, a Roebuck's Head erased, between two Hands holding Daggers all proper;" borne by the right hon. Donald Mackay, lord Reay. This family is said to derive their descent from Alexander, a younger son of Ochonacker, who, about the end of the twelfth century, came from Ireland; and the fourth in descent from him was Donald of Strathavern, whose son was named *Mac More*: and from him began the surname of *Mac T, Mackie, or Mackay*. Donald, the first lord of this family, was created baronet in 1625, and on June 20. 1628, was created baron Reay of the county of Caithness, by Charles I.

16. "Ermine, on a Cheveron Azure, three Foxes Heads erased Or, and in a Canton of the second a Fleur-de-lis of the third;" borne by the right hon. Stephen Fox, earl of Ilchester, &c. Of the family of Fox there have been many persons of note living in the counties of Dorset, Somerset, Wilts, and Hants, particularly Richard Fox, bishop of Winchester. His lordship was created lord Ilchester and baron Strangeways, May 11. 1741, 14 Geo. II. and earl of Ilchester in June 1756.

17. "Or, two Cheveronels Gules;" borne by the right hon. John Monfon, lord Monfon. This noble lord is descended from John Monfon, who flourished in

the reign of king Edward III. from whom descended another John, who attended king Henry V. in his wars in France. Sir John Monfon, bart. father of the present lord, was created lord Monfon, May 28, 1728.

18. "Or, on a Fefs, between two Cheveronels Sable, three Crofs-croffets of the first;" borne by the right hon. George Walpole, earl of Orford, &c. This family took their name from Walpole in Norfolk, where they resided before the conquest. Sir Robert Walpole was, in king George II.'s reign, elected knight of the garter in 1726, and created earl of Orford, February 9. 1741-2.

19. "Azure, three Cheveronels interlaced Or, and a Chief of the last;" borne by the name of *Fitz-Hugh*.

20. "Argent, three Cheveronels Gules, in Chief a Label Azure;" borne by the right hon. William Wildman Barrington, viscount Barrington, &c. This family is of Norman extraction; in which duchy, whilst it continued annexed to the English crown, there were to be seen the remains of a castle bearing the name of *Chute* or *Shute*, and formerly in the family, with other monuments in several towns of that duchy. John Shute, the late viscount Barrington, was in 1708 made a commissioner of the customs, and succeeded to the estates of Francis Barrington, Esq; and of John Wildman of the county of Berks, who made him their heir; and, in pursuance of the will of the former, he took the name and arms of *Barrington*. On June 11, 1720, he was created viscount Barrington, with a reverend grant of the office of master of the rolls in Ireland.

ART. VI. Of the Cross.

THE *Crofs* is an ordinary formed by the meeting of two perpendicular with two horizontal lines in the fefs-point, where they make four right-angles; the lines are not drawn throughout, but discontinued the breadth of the ordinary, which takes up only the fifth part of the field when not charged; but if charged, then the third. It is borne as well engrailed, indented, &c. as plain.

There is so great a variety of crosses used in heraldry, that it would be a very difficult task to treat of them all. Guillim has mentioned 39 different sorts; De la Colombiere, 72; Leigh, 46; and Upton declares he dares not ascertain all the various crosses borne in arms, for that they are almost innumerable: therefore, as all their forms cannot be expected here, we will only take notice of such as are most commonly seen at present in coats-of-arms. See Fig. x.

The first is "Quarterly, Ermine and Azure, a ^{plate} Crofs Or;" borne by his grace Thomas Osborne duke of Leeds, &c. This noble duke is descended from the honourable family of the Osbornes of Ashford, in the county of Kent; Sir Thomas Osborne, the grandfather to the present duke, was advanced to the peerage by king Charles II.

2. "Gules, a Crofs engrailed Argent, a Lozenge in the dexter-chief of the second;" borne by the right hon. Edward Leigh, lord Leigh. This family took their surname from the town of High-Leigh in Cheshire, where they resided before the Norman Conquest. Sir Thomas Leigh, the first lord of this family, was created

Of
the Crofs.

created baron Leigh of Stonely, by king Charles I. on July 1, 1643.

3. "Gules, a Crofs Argent fretty Azure;" borne by the right hon. Nicholas Taaffe, viscount Taaffe, of Corran, &c. in Ireland. Of this noble and ancient family was Richard Taaffe, who lived in 1282; as in 1306 did John Taaffe, who was archbishop of Armagh; and, in 1479, the order of the Garter being established in Ireland, Sir Nicholas Taaffe was one of the first members; and John, his son and heir, was created a baron and viscount by Charles I. August 1, 1628.

4. "Sable, a Crofs raguly Or;" borne by the name of *Stowary*.

5. "Argent, on a Crofs Sable a Leopard's-face Or;" borne by his grace Henry Brydges duke of Chandos, &c. The ancestors of this noble family took their name from the city of Bruges in Flanders; and one of them came over with William the Conqueror, and had a considerable share in the victory obtained near Hastings in Suffex, 1066. James, the father of the present duke, was created viscount Wilton and earl of Caernarvon, October 19, 1714; and marquis of Cearnarvon and duke of Chandos, — 30, 1719.

6. "Or, on a Crofs Sable, a patriarchal Crofs of the Field;" borne by the right hon. Thomas Vesey, baron of Knapton in the kingdom of Ireland. The truly noble family of Vescey or Vesey, derives its origin from Charles the Great, king of France, and emperor of the west, who died at Aix-la-Chapelle in Germany, Jan. 28, 814. His lordship's father was created a peer April 10, 1750.

7. "Argent, on a Crofs Gules, five Escalops Or;" borne by the right hon. William Villiers earl of Jersey, &c. This noble earl is descended from the family of Villiers in Normandy, some whom came over to England with the Conqueror; several manors and lands in England being soon after granted to Pagan de Villiers, one of this earl's ancestors. The first peer of this family was created a baron and viscount, March 20, 1690.

8. "Sable, on a Crofs within a Bordure engrailed Or, five Pellets;" borne by the right hon. Francis Greville, earl of Brooke and Warwick, &c. The ancestors of this noble family are of Norman extraction, and came over with William the Conqueror, who conferred manors and land on them in England, of a considerable value; and at length they obtained the government of the castle of Warwick, the present seat of the family. Sir Fulke, the first peer of this family, was created baron Brooke by king James I. Jan. 9, 1620.

9. "Argent, a Crofs bottonny Sable;" borne by the name of *Winwood*.

10. "Or, a Crofs-croset Gules;" borne by the name of *Taddington*.

11. "Azure, a Crofs potent fitchy Or." This ensign is said to have been borne by Ethelred king of the West-Saxons; and crofses of this sort are frequently met with in coats-of-arms.

12. "Party per pale, Gules and Argent; a Crofs potent quadrate in the centre, between four Crofses patee counter-changed;" the arms of the episcopal see of Litchfield and Coventry. This see was originally fixed at Litchfield; from thence removed to Chester,

and from both to Coventry. It contains the whole county of Stafford, except two parishes; all Derbyshire; the better part of Warwickshire, and near half Shropshire; divided into the four archdeaconries of Coventry, Stafford, Derby, and Salop. The parishes are 557 in number; but, including chapels, they amount to 643.

13. "Azure, a Crofs moline Argent;" borne by his grace William Henry Bentick, duke of Portland, &c. This noble duke is descended from a very ancient and distinguished family in the United Provinces of Holland, of which was William Bentick, Esq. who, in his youth was page of honour to William prince of Orange, afterwards William III. king of Great Britain, and, on the accession of William and his consort, was made groom of the stole, privy-purse to his majesty, lieutenant-general of his majesty's army, &c. and also created baron of Cirencester, viscount Woodstock, and earl of Portland, April 19, 1689.

14. "Argent, a Crofs patee Sable;" borne by the name of *Rice*.

15. "Sable, a Crofs patee Argent;" borne by the name of *Maplefen*.

16. "Azure, a Crofs flowery Or;" borne by the name of *Cheney*.—This is said to have also been the arms of Edwine, the first Christian king of Northumberland.

17. "Argent, fix Crofs crosetts fitchy 3, 2, 1, Sable, on a Chief Azure, two Mulletts pierced Or;" borne by his grace Henry Clinton, duke of Newcastle, &c. This noble family is descended from Jeffrey de Clinton, lord chamberlain and treasurer to king Henry I. grandson to William de Tankerville, chamberlain of Normandy; from whom descended William de Clinton, chief justice of Chester, governor of Dover castle, lord Warden of the king's forests south of Trent. Edward, lord Clinton, another of this noble earl's ancestors, was constituted lord high-admiral of England for life, in the reign of queen Elizabeth, who created him earl of Lincoln, May 4, 1572.

18. "Gules, a Cheveron between ten Crofses patee, six above and four below, Argent;" borne by the right hon. Frederick-Augustus Berkeley, earl of Berkeley, &c. This noble family is descended from Robert Fitz-Harding, who obtained a grant of Berkeley-castle in Gloucestershire, which the family still inherits, and from whence they obtained the surname of *Berkeley*, from Henry duke of Normandy, afterwards king of England; the said Robert Fitz-Harding was descended from the royal line of the kings of Denmark.

19. "Azure, three Mulletts Or, accompanied with seven Crofs-crosetts fitchy Argent, three in Chief, one in Fess, two in Flanks, and the last in Base;" borne by the right hon. James Somerville, lord Somerville. The first of this name on record is Sir Walter de Somerville, lord of Wichnere, in the county of Stafford, who came to England with William the Conqueror. About the beginning of the reign of king William, in 1170, the Somervilles were possessed of a fair estate in the county of Lanark and elsewhere.

20. "Gules, three Crofses reercedlee, voided Or, a Chief varyy ermine and centre ermine;" borne by the

OF
the Crofs.

Fig. 7.
FURZES &c.Fig. 8.
CHESTNUTS &c.Fig. 9.
FRANKS & BARS.Fig. 10.
CROOKS.



the right hon. John-Peyto Verney, baron Willoughby de Broke. This noble lord is descended from William de Verna, who flourished in the reign of king Henry I. 1419.

ART. VII. Of the SALTIER.

THE Saltier, which is formed by the bend and bend-finister crossing each other in right angles, as the interfecting of the pale and fess forms the cross, contains the fifth part of the field, but if charged then the third. In Scotland, this ordinary is frequently called a *St Andrew's cross*. It may, like the others, be borne engrailed, wavy, &c. as also between charges or charged with any thing. See examples, fig. xi.

Plate
CXLVII.

Nº 1. is "Argent, a Saltier Gules;" borne by his grace James Fitz-Gerald, duke of Leinster, &c. This noble lord is descended from Otho, or Other, a rich and powerful lord in the time of king Alfred, descended from the dukes of Tuscany; who passing from Florence into Normandy, and thence into England, there the family flourished, until Richard Strongbow, earl of Pembroke, their kinsman, engaged them to partake in his expedition to Ireland, in which Maurice Fitz-Gerald embarked, and was one of the principal conquerors of that kingdom, for which he was rewarded with a great estate in lands in the province of Leinster, and particularly the barony of Offaley, and the castle of Wicklow; and died, covered with honours, in the year 1177, 24 Henry II.

2. "Gules, a Saltier Argent, between twelve Cross crosslets Or;" borne by the right hon. Other-Lewis Windfor Hickman, earl of Plymouth, &c. This noble earl is descended from Robert Fitz-Hickman, lord of the manor of Bloxham, Oxfordshire, in the 56 Hen. III. 1272; and he is maternally descended from the noble family of the Windfors, who were barons of the realm at the time of the conquest.

3. "Vert, a Saltier wavy Ermine;" borne by the name of *Wakeman* of Beckford, in Gloucestershire.

4. "Ermine, a Saltier counter-compony Or and Gules;" borne by the name of *Umslon*.

5. "Argent, a Saltier Azure with a Bezant in the centre;" borne by the right hon. Philip Yorke, earl of Hardwicke, &c. He was in October 1733 constituted lord chief-justice of the king's bench, and November 23, in the same year, created baron Hardwicke of Hardwicke.

6. "Argent on a Saltier Gules an Escallop Or;" the arms of the bishoprick of Rochester—This Diocese, the least in England, comprehends only a small part of Kent, in which there are 150 churches and chapels; and the two parishes in Iselham in Cambridgeshire, and Frekenham in Suffolk. It has only one archdeacon, that of Rochester. For many years it was in the immediate patronage of the archbishop of Canterbury.

7. "Party per Saltier, Azure and Argent, on a Saltier Gules a Crescent of the second for difference;" quartered by the right hon. William Hall Gage, viscount Gage, of Castle-Island in Ireland. This noble family is of Norman extraction, and derives descent from de Gage or Gage, who attended William I. in his expedition to England: and, after the conquest thereof, was rewarded with large grants of lands in the forest of Dean, and county of Gloucester, near which forest

he fixed his residence, by building a seat at Clerenwell, in the same place where the house of Gage now stands: he also built a great house in the town of Cirencester, at which place he died, and was buried in the abbey there. Sir Thomas Gage, the eighth baronet, and father to the present lord Gage, was created baron of Castle-Bar, and viscount Gage, 1721.

8. "Gules, on a Saltier Argent, a Rose of the first barbed and feeded proper;" borne by the right hon. George Neville, lord Abergavenny, premier baron of England.

9. "Or, on a Saltier Azure, nine Lozenges of the first;" the paternal arms of the right hon. John Dalrymple, earl of Stair, &c. Of this family, which took their surname from the barony of Dalrymple, lying on the river Dnn in Ayrshire, Scotland, was Adam de Dalrymple, who lived in the reign of Alexander III.

10. "Argent, on a Saltier engrailed Sable, nine Annulets Or;" borne by the name of Leak.

11. "Gules, a Saltier between four Crescents Or;" borne as the 2d and 3d quarters in the coat-of-arms of the right hon. Charles Kinnaird, lord Kinnaird. George Kinnaird, esq; one of the present lord's ancestors, being of great service to king Charles II. during the usurpation of Oliver Cromwell, he was by that prince, at his restoration, made one of the privy-council; and December 28. 1682, created a baron.

12. "Argent, a Saltier engrailed between four Roses Gules;" for Lennox; and borne as 1st and 4th quarters in the coat-of-arms of the right hon. Francis Napier, lord Napier. This family is said to be descended from the ancient thanes or stewards of Lennox in Scotland, but took their surname of Napier from the following event. King David II. in his wars with the English, about the year 1344, convocating his subjects to battle, the earl of Lennox sent his second son Donald, with such forces as his duty obliged him; and, coming to an engagement, where the Scots gave ground, this Donald, taking his father's standard from the bearer, and valiantly charging the enemy with the Lennox men, the fortune of the battle changed, and they obtained the victory; whereupon every one advancing, and reporting their acts, as the custom was, the king declared they had all behaved valiantly, but that there was one among them who had *na pier*, that is, no equal; upon which the said Donald took the name of Napier, and had, in reward for his good services, the lands of Gosfield, and other estates in the county of Fife.

13. "Gules, a Saltier Or, surmounted of another Vert;" for the name of *Andrews*; and borne by Sir William Andrews, bart. of Denton in Northamptonshire, who is descended from Sir Robert Andrews of Normandy, knight, who came into England with William the Conqueror. Sir William Andrews, the first baronet of this family, was created December 11, 1641.

14. "Azure, a Saltier quarterly quartered Or and Argent." The arms of the episcopal see of Bath and Wells.—The diocese of Bath and Wells contains all Somersetshire, except a few churches in Bristol. And in it there are three archdeacons, viz. those of Wells, Bath, and Taunton. The number of the parishes is 388, though, according to some, the total number of the churches and chapels amounts to 503.

15. "Party per Saltier Argent and Gules, a Saltier counter-changed."

16. "Party per Pale indented Argent and Sable, a Saltier counter-changed;" borne by the name of *Scote*.

17. "Argent, three Saltiers couped and engrailed Sable;" borne by the name of *Benton*.

18. "Argent, a Saltier Gules, and a Chief Ermine;" borne by the right hon. Francis Thomas Fitz-Maurice, earl of Kerry, &c. This very ancient and noble family is a branch of the family of Kildare, who are originally descended from the great duke of Tufcaney, and of which was Otho, a noble baron of Italy, whose son Walter, attending the Norman Conqueror into England, was made constable of the castle of Windsor. Raymond, one of the present earl's ancestors, had a principal hand in the reduction of Ireland to the subjection of Henry II. and Dermoid Mac-Carty, king of Cork, fought his aid against his son Cormac O'Lehanagh, which he undertook, and delivered the king from his rebellious son; for which that prince rewarded him with a large tract of land in the county of Kerry, where he settled his son Maurice, who gave his name to the county, which he called *Clan Maurice*, and is enjoyed by the present earl of Kerry, who is viscount Clan Maurice. Thomas the first earl, and father of the last, was the 21st lord Kerry, who was created earl, January 17. 1722.

19. "Sable, a Saltier Argent, on a Chief Azure, three Fleurs-de-lis Or;" borne by the right hon. John Fitz-Patrick, earl of Upper Ossory, and baron of Gowran in Ireland. This most ancient and princely family is descended from Heremon, the first monarch of the Milesian race in Ireland; and after they had assumed the surname of Fitz-Patrick, they were for many ages kings of Ossory, in the province of Leinster. John, the first earl of this family, succeeded his father Richard as lord Gowran, June 9. 1727, was created earl, October 5. 1751, and died 1758.

20. "Party per Pale Argent and Gules, three Saltiers counter-changed;" borne by the name of *Lane*. These arms are also borne, without the least alteration, by the name of *Kingsfinan*; for which similitude we can no otherwise account, than by supposing there has been some mistake made through many transcriptions.

SECT. II. Of Sub-Ordinaries.

BESIDES the honourable ordinaries and the diminutions already mentioned, there are other heraldic figures, called *sub-ordinaries*, or *ordinaries* only, which, by reason of their ancient use in arms, are of worthy bearing, viz. The Gyron, Franc-quarter, Canton, Pairle, Fret, Pile, Orle, Inescutcheon, Treffure, Anulet, Flanches, Flagues, Voiders, Billet, Lozenge, Guts, Fusil, Rustre, Mascle, Papillone, and Diaper. See Plate CXLIV. fig. i. (A.)

The Gyron is a triangular figure formed by two lines, one drawn diagonally from one of the four angles to the centre of the shield, and the other is drawn either horizontal or perpendicular, from one of the sides of the shield, meeting the other line at the centre of the field.

Gyronny is said, when the field is covered with fix, eight, ten, or twelve gyrons in a coat-of-arms: but a French author would have the true gyronny to consist

of eight pieces only, as in the fig. which represents the coat-of-arms of the right hon. John Campbell, earl of London, &c. whose ancestor was created baron of London in 1604 by James VI. and earl of the fame place, May 12. 1633, the 9th of Charles I.

The Franc-quarter is a square figure, which occupies the upper dexter quarter of the shield. It is but rarely carried as a charge. *Silvestra Petra Sancta* has given us a few instances of its use.

The Canton is a square part of the escutcheon, somewhat less than the quarter, but without any fixed proportion. It represents the banner that was given to ancient knights-bannerets, and, generally speaking, possesses the dexter-chief-point of the field, as in the fig.; but should it possess the sinister-corner, which is but seldom, it must be blazoned a canton-sinister.

James Coats reckons it as one of the nine honourable ordinaries, contrary to most heralds opinion. It is added to coats-of-arms of military men as an augmentation of honour: thus John Churchill, baron of Eymouth in Scotland, and one of the ancestors of the present duke of Marlborough, being lieutenant general to king James II. received from him a canton argent, charged with the red cross of England, added to his paternal coat, "which is Sable, a lion rampant Argent."

The pairle is a figure formed by the conjunction of the upper half of the saltier with the under half of the pale.

The fret is a figure representing two little sticks in saltier, with a mascle in the centre interlaced. J. Gibbon terms it the *heralds true-lovers knot*; but many dissent from his opinion.

Fretty is said when the field or bearings are covered with a fret of fix, eight, or more pieces, as in the fig. The word *fretty* may be used without addition, when it is of eight pieces; but if there be less than that number, they must be specified.

The pile, which consists of two lines, terminating in a point, is formed like a wedge, and is borne engrailed, wavy, &c. as in the fig. It issues in general from the chief, and extends towards the base, yet there are some piles borne in bend, and issuing from other parts of the field, as may be seen in Plate CXLVII. fig. xii. n° 12, &c.

The Orle is an ordinary composed of two lines going round the shield, the same way as the bordure, but its breadth is but one half of the latter, and at some distance from the brim of the shield, as in the fig.

The Inescutcheon is a little escutcheon borne within the shield; which, according to Guillim's opinion, is only to be so called when it is borne single in the fess-point or centre; see the fig. on Plate CXLIV. but modern heralds, with more propriety, give the name of *inescutcheon* to such as are contained in Plate CXLVII. fig. xii. n° 2. and call that which is fixed on the fess-point *escutcheon of pretence*, which is to contain the arms of a wife that is an heiress, as mentioned above.

The Treffure is an ordinary commonly supposed to be the half of the breadth of an orle, and is generally borne flowery and counter-flowery, as it is also very often double, and sometimes treble. See the fig. (Plate CXLIV.). This double treffure makes part of the arms of Scotland, as marshalled in the royal achievement.

Sub-Ordinaries.

Sub-Ordinaries.

chievement, Plate CXLIX. fig. xxi. n^o 7. and was granted to the Scots kings by Charlemagne, being then emperor and king of France, when he entered in a league with Achaus king of Scotland, to shew that the French lilies should defend and guard the Scottish lion.

The Annulet, or ring, is a well-known figure, and is frequently to be found in arms through every kingdom in Europe.

The Flanches are formed by two curved lines, or semicircles, being always borne double. See the figure. G. Leigh observes, that on two such Flanches two sundry coats may be borne.

Plate CXLIX.

The Flaques resemble the flanches, except that the circular lines do not go so near the centre of the field; (see the figure). J. Gibbon would have these two ordinaries to be both one, and wrote *flank*; alleging, that the two other names are but a corruption of this last: but as G. Leigh and J. Guillim make them two distinct and subordinate ordinaries, we have inserted them here as such.

The Voiders are by Guillim considered as a subordinate ordinary, and are not unlike the flaques, (see the figure,) but they occupy less of the field.

The Billet is an oblong square figure, twice as long as broad. Some heralds imagine, that they represent bricks for building; others more properly consider them as representing folded paper or letters.

The Lozenge is an ordinary of four equal and parallel sides, but not rectangular; two of its opposite angles being acute, and the other two obtuse. Its shape is the same with those of our window-glasses, before the square came so much in fashion. See the figure.

Cuts, or drops, are round at bottom, waved on the sides, and terminate at the top in points. Herald's have given them different names according to their different tinctures: thus if they are

Yellow	} they are called	{ d' Or
White		{ de Eau
Red		{ de Sang
Blue		{ de Larmes
Green		{ de Vert
Black		{ de Pois

The fustil is longer than the lozenge, having its upper and lower part more acute and sharp than the other two collateral middle parts, which acuteness is occasioned by the short distance of the space between the two collateral angles; which space, if the fustil is rightly made, is always shorter than any of the four equal geometrical lines wherewith it is composed. See the fig. *iiid*.

The Rustre is a lozenge pierced round in the middle; (see the figure.) They are called by the Germans, *rusten*. Menestrier gives an example of them in the arms of Lebarat in France, argent three rustres azure.

The Mascle is pretty much like a lozenge, but voided or perforated through its whole extent, shewing a narrow border, as in the figure. Authors are divided about its resemblance; some taking it for the mesh of a net, and others for the spots of certain flints found about Rohan; and as no writer has given a clearer account in support of this last opinion than Colombiere, author of *La Science Heraldique*, we shall transcribe it for the satisfaction of the curious.

"Rohan (says he) bears Gules, nine Mascles Or, VOL. V.

3, 3, 3. Opinions have varied very much about the original of the mascles or meshes, as being somewhat like the meshes of nets: but for my own part, having often observed that those things which are remarkable and singular in some countries, have sometimes occasioned the lords thereof to represent them in their escutcheons, and to take them for their arms, I am of opinion, that the lords of Rohan, who, I believe, are the first that bore these figures in their arms, tho' descended from the ancient kings and princes of Bretagne, took them, because in the most ancient viscounty of Rohan, afterwards erected into a duchy, there are abundance of small flints, which being cut in two, this figure appears on the inside of them; as also the carps, which are in the fish-ponds of that duchy, have the same mark upon their scales; which, being very extraordinary and peculiar to that country, the ancient lords of the same had good reason, upon observing that wonder, to take those figures for their arms, and to transmit them to their posterity, giving them the name of *mascles*, from the latin word *macula*, signifying a spot; whence some of that house have taken for their motto, *Sine macula macula*, that is, A mascle without a spot."

Papillon is an expression used for a field or charge that is covered with figures like the scales of a fish. Mons. Baron gives as an example of it the arms of Monti Gueules Papelone d'Argent. The proper term for it in English would be *scallop-work*.

Diapering is said of a field or charge shadowed with flourishes or foliage with a colour a little darker than that on which it is wrought. The Germans frequently use it; but it does not enter into the blazoning or description of an arms, it only serves to embellish the coat.

If the fore-mentioned ordinaries have any attributes, that is, if they are engrailed, indented, wavy, &c. they must be distinctly specified, after the same manner as the honourable ordinaries.

See examples of sub-ordinaries, &c. fig. xii.

Plate CXLVII.

1. "Gules, an Orle Ermine;" borne by the name of *Hunframville*.

2. "Argent, three Inescutcheons Gules;" borne by the name of *Hay*, the 2d and 3d quarters in the coat-of-arms of the right hon. Thomas Hay, earl of Kinnoul, &c.—The first of the name of Hay that bore these arms, got them, as Mr Nisbet observes, because he and his two sons, after having defeated a party of the Danes at the battle of Luncarty, anno 942, were brought to the king with their shields all stained with blood.

3. "Argent, a Fret Sable;" borne by the right hon. Lionel Talmash, earl of Dyfart, &c. This family was advanced to the peerage by king Charles I. in 1646.

4. "Or, fretty of Gules, a Canton Ermine;" borne by the right hon. Henry Noel, earl of Gainfborough, &c. This nobleman is descended from — Noel, who came into England with William the Conqueror, and, in consideration of his services, obtained a grant of several manors and lands of very great value. Sir Edward, who was knighted by king James on his accession to the throne, and created a baronet June 29, 1611, was the first advanced to the honour of baron Noel, March 23, 1616.

5. "Girony of eight Pieces Or and Sable;" the 20 O 11

1st and 4th quarters of the coat-of-arms of the right hon. John Campbell, earl of Breadalbane, &c. This ancient and noble family is descended, in a regular succession, from Duncan the first Lord Campbell, ancestor of the family of Argyll. John, the first earl, in consideration of his personal merit, was, from a baronet, created lord Campbell, viscount Glenorchie, and earl of Breadalbane, Jan. 28. 1677, by Charles II.

6. "Lozeagy Argent and Gules;" borne by the right hon. George Fitz-William, earl Fitz-William, &c. This noble earl is descended from Sir William Fitz-William, marshal of the army of William the Conqueror at the battle of Hastings in Suffex, by which victory that prince made his way to the throne.

7. "Sable, a Mascle within a Tressure flowery Argent;" borne by the name of *Hoblethorne*.

8. "Gules, three Mulletts Or, within a Bordure of the latter, charged with a double Tressure flowery and counter flowery with Fleurs-de-lis of the first;" borne by the right hon. William Sutherland, earl of Sutherland, &c. According to the traditional account of some Scottish writers, this family, in the peerage, is older than any in North-Britain, if not in all Europe; the title of *earl* being conferred on one of their ancestors in 1057.

9. "Azure, a Pile Ermine," for the name of *Wyche*; and is quartered as first and fourth in the coat-of-arms of Sir Cyril Wyche, bart. his majesty's resident at the Hans-Towns.

10. "Or, on a Pile engrailed Azure, three Crosseslets fitchy of the first;" borne by the name of *Rigdon*.

11. "Or, on a Pile Gules three Lions of England between six Fleurs-de-lis Azures;" the first and fourth quarters of his grace Edward Seymour, duke of Somerset, &c. granted him by king Henry VIII. on his marriage with the lady Jane Seymour.

12. "Ermine, two Piles issuing from the dexter and sinister sides, and meeting in Base Sable;" for the name of *Holles*.

13. "Argent, three Piles, one issuing from the Chief between the others reversed, Sable;" for the name of *Hulfe*, and borne by Sir Edward Hulfe, bart. of Lincoln's-inn fields, Middlesex.

14. "Azure, a Pile wavy bendways Or;" borne by the name of *Alldham*.—There is no mention made of its issuing out of the dexter-corner of the escutcheon, for this is sufficiently determined by the term *bendways*.

15. "Or, three Piles in Bend, each point ensigned with a Fleur-de-lis Sable;" borne by the name of *Norton*.

16. "Argent, three Piles meeting near the point of the Base Azure;" borne by the name of *Bryan*.

17. "Party per Pale and per Bend Or and Azure counter-changed;" borne by the name of *Johnson*.—This bearing is equal to two gyrons; see p. 3596. col. 1.

18. "Party per Pale and per Cheveron Argent and Gules counter-changed."

19. "Party per Pale chappé Or and Vert counter-changed." This is a bearing seldom to be met with.

20. "Party per Fefs Gules and Argent, a Pale counter-changed;" borne by the name of *Lavider*.

SECT. III. OF COMMON CHARGES borne in coats-of-arms.

It has been already observed, that in all ages men have made use of the representation of living creatures, and other symbolical signs, to distinguish themselves in war; and that these marks, which were promiscuously used for hieroglyphs, emblems, and personal devices, gave the first notion of heraldry. But nothing shews the extent of human wit more, than the great variety of these marks of distinction, since they are composed of all sorts of figures, some natural, others artificial, and many chimerical; in allusion, it is to be supposed, to the state, quality, or inclination of the bearer.

Hence it is, that the sun, moon, stars, comets, meteors, &c. have been introduced to denote glory, grandeur, power, &c. Lions, leopards, tigers, serpents, flags, &c. have been employed to signify courage, strength, prudence, swiftness, &c.

The application to certain exercises, such as war, hunting, music, &c. has furnished lances, swords, pikes, arms, fiddles, &c. Architecture, columns, cheverons, &c.; and the other arts several things that relate to them.

Human bodies, or distinct parts of them, also clothes and ornaments, have, for some particular intention, found place in armory; trees, plants, fruits, and flowers, have likewise been admitted to denote the rarities, advantages, and singularities, of different countries.

The relation of some creatures, figures, &c. to particular names, has been likewise a very fruitful source of variety in arms. Thus the family of Coningsby bears three conies; of Arundel, six swallows; of Urson, a bear; of Lucie, three pikes, in Latin *tres lucios pices*; of Starkey, a stork; of Castleman, a castle triple-towered; of Shuttleworth, three weaver's shuttles, &c.

Besides these natural and artificial figures, there are chimerical or imaginary ones used in heraldry, the result of fancy and caprice; such as centaurs, hydras, phenixes, griffons, dragons, &c. Which great variety of figures shews the impossibility of comprehending all common charges in a work of this nature; therefore such only shall be treated of as are most frequently borne in coats-of-arms.

ART. I. OF NATURAL FIGURES borne in coats-of-arms.

AMONG the multitude of natural things which are used in coats-of-arms, those most usually borne are, for the sake of brevity as well as perspicuity, distributed into the following classes, viz.

Celestial figures; as the sun, moon, stars, &c. and their parts.

Effigies of men, women, &c. and their parts.

Beasts; as lions, flags, foxes, boars, &c. and their parts.

Birds; as eagles, swans, storks, pelicans, &c. and their parts.

Fishes; as dolphins, whales, sturgeons, trouts, &c. and their parts.

Reptiles

Reptiles and insects; as tortoises, serpents, grasshoppers, &c. and their parts.

Vegetables; as trees, plants, flowers, herbs, &c. and their parts.

Stones; as diamonds, rubies, pebbles, rocks, &c.

These charges have, as well as ordinaries, divers attributes or epithets, which express their qualities, positions, and dispositions. Thus the sun is said to be in his *glory, eclipsed, &c.* The moon in her *complement, increfcent, &c.* Animals are said to be *rampant, passant, &c.* Birds have also their denominations, such as *close, displayed, &c.* Fishes are described to be *hauriant, natant, &c.*

I. Examples of Celestial Figures.

1. "Azure, a Sun in his Glory;" borne by the name of *St. Clere*; and is found in the 1st and 4th quarters of the coat-of-arms of the most noble William-Henry Ker, marquis of Lothian, &c. It is needless to express the colour of the sun, nothing being capable to denote it but gold.

2. "Azure, one Ray of the Sun, bendways Gules, between fix Beams of that Luminary Argent;" borne by the name of *Aldam*. There is no mention made of their issuing out of the dexter-corner of the escutcheon; for this is implied in the term *bendways*, for the reason mentioned before.

3. "Argent, five Rays of the Sun issuing out of the sinister-corner Gules;" borne by the name of *Mudshideler*, a family of distinction in Franconia.

4. "Or, a Sun eclipsed." This bearing is seldom to be met with, except in emblematic or hieroglyphic figures; and might be expressed *Sable*, because that hue is accidental and not natural.

5. "Gules, the Moon in her complement Or, illustrated with all her light proper." This is sufficient without naming the colour, which is *Argent*.

6. "Azure, a Moon decrefcent proper;" borne by the name of *Delaluna*.

7. "Gules, a Moon increfcent Or;" borne by the name of *Defcui*.

8. "Argent, a Moon in her *detriment*, *Sable*." This word is used in heraldry to denote her being eclipsed.

9. "Azure, a Crescent Argent;" borne by the name of *Lucy*. This bearing is also used as a difference, it being assigned to the second son, as before-mentioned.

10. "Gules, three Crescents Argent;" borne by the right hon. David Oliphant, lord Oliphant. Amongst the ancestors of this noble family was David de Oliphant, one of those barons who, in 1142, accompanied king David I. into England with an army, to assist his niece Matilda against king Stephen; but, after raising the siege of Winchester, the said king David was so closely pursued, that, had it not been for the singular conduct of this brave person, the king would have been taken prisoner.

11. "Azure, a Crescent between three Mulletts Argent;" borne by the right hon. John Arbuthnot, viscount and baron Arbuthnot. In the year 1105, the first of this family marrying a daughter of the family of Oliphant, sheriff of the county of Kincardin, with her he had the lands of Arbuthnot in that county, from whence he took his surname. Robert Arbuth-

not was the first of this family who, for his loyalty to king Charles I. was, Nov. 16. 1641, dignified with the title of *baron and viscount Arbuthnot*.

12. "Gules, a Star issuing from between the Horns of a Crescent Argent."

13. "Azure, a Star of 16 points Argent;" borne by the name of *Huifon*.

14. "Argent, three Mulletts pierced *Sable*;" borne by the name of *Wollaffen*.

15. "Azure, six Mulletts 3, 2, 1, Or;" borne by the name of *Welfsh*.

16. "Ermine, a Mullet of six points Gules, pierced;" borne by the name of *Hussenhul*.—When a mullet has more than five points, their number must, in blazoning, be always named.

17. "Argent, a Rain-bow with a Cloud at each end proper." This is part of the crest to the earl of Hopeton's coat-of-arms, which is inserted in fig. ix. n° 13. The whole of it is a globe split on the top, and above it is the rain-bow, &c.

18. "Party per Fels crenelle Gules and Azure, three Suns proper;" borne by the name of *Pierfon*.

19. "Gules, a Mullet between three Crescents Argent;" borne by the name of *Oliver*.

20. "Gules, a Chief Argent, on the lower part thereof a Cloud, the Sun's resplendent rays issuing throughout proper;" borne by the name of *Leefer*.

II. Examples of Effigies of Men, &c. and their parts.

1. "Azure, the Virgin Mary crowned, with her Babe in her right arm, and a Sceptre in her left, all Or;" borne by the coat-of-arms of the bishopric of Salisbury.—This bishop's see was at first fixed at Sherborn in Dorsetshire; and contained all that district which is now divided into the dioceses of Salisbury, Bristol, Wells, and Exeter. In the year 905, the dioceses of Wells, Crediton, and St Germans (now Exeter), were taken from it. And it was, moreover, parcelled out into the two bishoprics of Sherborn and Wilton. The present diocese of Salisbury, or Sarum, contains all Wiltshire, except two parishes; and all Berkshire, excepting one parish, and part of another. There are in it three archdeacons, namely, of Salisbury, Wilts, and Berks; and the number of parish-churches and chapels, in the whole, is about 550. It has several peculiars of its own in Dorsetshire; though in Bristol diocese.

2. "Azure, a Presbyter, sitting on a Tomb-stone, with a Crown on his Head and Glory Or, his right hand extended, and holding in his left an open Book Argent, with a Sword cross his mouth Gules." The coat-of-arms of the bishopric of Chichester. The see of Chichester was anciently in the isle of Selsey, but removed to Chichester by Stigand. This diocese contains the whole county of Sussex (except 22 peculiars belonging to the archbishopric of Canterbury), wherein there are 250 parishes, and two archdeacons, those of Chichester and Lewis. Some reckon the number of churches and chapels to be 302.

3. "Azure, a Bishop habited in his pontificals, sitting on a chair of state, and leaning on the sinister side thereof, holding in his left hand a crozier, his right being extended towards the dexter chief of the escutcheon, all Or; and resting his feet on a cushion, Gules, tasselled of the second." The coat-of-arms of the bishopric

shopric of Clogher, in Ireland.

4. "Azure, a Bishop habited in his pontificals, holding before him, in a Pale, a Crucifix proper." The coat-of-arms of the bishopric of Waterford, in Ireland.

5. "Or, a Man's Leg couped at the midft of the thigh Azure;" borne by the name of *Haddon*.

6. "Azure, three sinister Hands couped at the wrist, and erected Argent;" borne by the ancient family of Malmaims.

7. "Argent, three sinister Hands couped at the wrist, and erected Gules;" borne by the name of *Maynard*. By these two last examples it appears, that different coats-of-arms may be easily made from the same figure or figures, by varying the colours only, without the addition of any other charge, counter-changings, partings, &c.

8. "Argent, a Man's Leg erased at the midft of the thigh Sable;" borne by the name of *Prime*.

9. "Gules, three Legs armed proper, conjoined in the Fess-point at the upper part of the thighs, flexed in triangle, garnished and spurred Or." This is the coat-of-arms of the Isle of Man; and is quartered by the most noble John Murray, duke of Athole, titular lord or king of that isle.

10. "Gules, three dexter Arms vambraced fessways in Pale proper;" borne by the name of *Armstrong*. This coat is very well adapted to the bearer's name, and serves to denote a man of excellent conduct and valour.

11. "Or, three Legs couped above the knee Sable;" borne by the name of *Hoffy*.

12. "Vert, three dexter Arms conjoined at the shoulders in the Fess-point, and flexed in triangle Or, with fists clenched Argent;" borne by the name of *Tremain*.

13. "Argent, a Man's Heart Gules, within two equilateral triangles interlaced Sable;" borne by the name of *Villager*, a family of distinction in Provence.

14. "Azure, a sinister Arm, issuing out of the dexter-chief, and extended towards the sinister-base Argent."

15. "Argent, a dexter Hand couped at the wrist and erected, within a Bordure engrailed Sable;" borne by the name of *Manley*.

16. "Argent, a Man's Heart Gules, ensigned with a Crown Or, and on a Chief Azure, three Mullets of the first." The paternal coat of the name of *Douglas*, and quartered in the arms of the dukes of Hamilton and Queensbury; as also in those of the earls of Morton and March, and the Lord Mordington.

17. "Gules, a Saracen's Head affrontée erased at the neck Argent, environed about the temples with a wreath of the second and Sable;" borne by the name of *Mergill*.

18. "Argent, three Blackamoors Heads couped proper, banding about the head Argent and Gules;" borne by the name of *Tanner*.

19. "Gules, three Befeants each charged with a man's face affrontée proper;" borne by the name of *Gamin*.

20. "Or, a Blackamoor's Head couped proper, banding about the Head Argent;" borne by the name of *Ufloc*.

Observe, that when half of the face, or little more, of human figures, is seen in a field, it is then said to be *in profile*; and when the head of a man, woman, or other animal, is represented with a full face, then it is termed *affrontée*.

III. Examples of the different Positions of Lions, &c. in coats-of-arms.

1. "Or, a Lion rampant Gules;" quartered by the right hon. Hugh Percy-Smithton, earl of Northumberland, &c. This noble earl is descended from the family of the Smithsons of Newsham in Yorkshire, which appears to have been possessed of lands in that county in the reign of king Richard II. His lordship, married July 18. 1740, the lady Elizabeth Seymour, only daughter of Algernon Seymour, late duke of Somerset, and earl of Northumberland, on whose death he was created earl of the same county, Feb. 7. 1749-50, and duke of the same county Oct. 22. 1766.

2. "Azure, a Lion rampant-guardant Or;" borne by the name of *Fitz-Hammond*.

3. "Gules, a Lion rampant-guardant Or;" quartered by the right hon. Charles Cadogan, lord Cadogan, &c. This noble lord is descended from Kehdlin, prince of Powis in Wales, from whom descended William Cadwyan or Cadogan of Llanbeder, in the county of Pembroke, another of the ancestors of this present lord, who was created a peer of Great Britain on June 21. 1716.

4. "Ermine, a Lion salient Gules;" borne by the name of *Worley*.

5. "Azure, a Lion statant-guardant Or;" borne by the name of *Bromfield*.

6. "Or, a Lion passant Gules;" borne by the name of *Games*.

7. "Argent, a Lion passant-guardant Gules, crowned Or;" quartered by the right hon. James Ogilvy, earl of Findlater, &c.

8. Gules, a Lion sejant Argent."

9. "Or, a Lion rampant double-headed Azure;" borne by the name of *Mason*.

10. "Sable, two Lions rampant-combatant Or, armed and langued Gules;" borne by the name of *Carter*.

11. "Azure, two Lions rampant-adoffee Or." This coat-of-arms is said to have been borne by Achilles at the siege of Troy.

12. "Sable, two Lioncels counter-passant Argent, the uppermost towards the sinister side of the escutcheon, both collared Gules;" borne by the name of *Glegg*.—It is the natural disposition of the lion not to bear a rival in the field: therefore two lions cannot be borne in one coat-of-arms, but must be supposed to be lion's whelps, called *lioncels*; except when they are parted by an ordinary, as in fig. viii. n° 17. or so disposed as that they seem to be distinctly separated from each other, as in fig. xv. n° 20. In the two foregoing examples they are called *lions*, because in the 10th they seem to be striving for the sovereignty of the field, which they would not do unless they were of full growth: and, in the 11th, they are supposed to represent two valiant men, whose dispute being accommodated by the prince, are leaving the field, their pride not suffering them to go both one way.

13. "Argent, a Demi-lion rampant Sable;" borne by the name of *Mervin*.

Of

Lions, &c.

Different
Animals.

14. "Gules, a lion couchant between six Crofs-croffets, three in Chief, and as many in Base, Argent;" for the name of *Tynte*; and is the first and fourth quarter of the arms of Sir Charles-Kerns Tynte, bart. elected knight of the shire for the county of Somerset to the four last and present parliaments, colonel of the second battalion of the Somerset militia, and LL.D.

15. "Azure, a Lion dormant Or."

16. "Or, out of the midst of a Fefs Sable, a Lion rampant-naissant Gules;" borne by the name of *Emme*. This form of blazon is peculiar to all living things that shall be found issuing out of the midst of some ordinary or other charge.

17. "Azure, three Lionsels rampant Or;" borne by the right hon. Richard Fienes, viscount and baron Saye and Sele. This noble lord is descended from John, baron Fienes, hereditary constable of Dover-castle, and lord Warden of the Cinque-ports, in the 12th century.

18. "Gules, a tricorporated Lion issuing from three parts of the Escutcheon, all meeting under one Head in the Fefs-point Or, langued and armed Azure;" borne by the name of *Crouchback*. This coat appertained to Edmund Crouchback, earl of Lancaster, in the reign of his brother king Edward I.

19. "Gules, a Bessant between three Demi-lions rampant Argent;" borne by the right hon. Charles Bennet, earl of Tankerville, &c. This noble earl is descended from the family of the Bennets in Berkshire, who flourished in the reign of king Edward III. Charles, lord Ossulton, grandfather of the present earl, was created earl of Tankerville, on October 19. 1714, by George I.

20. "Party per Pale Azure and Gules, three Lions rampant Argent;" borne by the right hon. Henry Herbert earl of Pembroke, &c. This noble family is descended from Henry Fitz-Roy, natural son to Henry I. Sir William Herbert, one of the ancestors of the present earl, was master of the horse to king Henry VIII. lord president of the marches of Wales, and knight of the garter. He was also, by that king, advanced to the dignity of baron Herbert of Caerdiff, October 10. 1551, and the very next day created earl of Pembroke.—Observe, that if a lion, or any other beast, is represented with its limbs and body separated, so that they remain upon the field at a small distance from their natural places, it is then termed *Dehaché* or *couped in all its parts*, of which very remarkable bearing, there is an instance in armory, which is, "Or, a Lion rampant Gules, deliaché, or couped in all its parts, within a double Tressure flowery and counter-flowery of the second;" borne by the name of *Maitland*.

IV. *Examples of other Quadrupeds, and their Parts, borne in Coats of Arms.*

1. "Sable, a Camel statant Argent;" borne by the name of *Camel*.

2. "Gules, an Elephant statant Argent, tusked Or;"

3. "Argent, a Boar statant Gules, armed Or;" borne by the name of *Trewarthen*.

4. "Sable, a Bull passant Or;" borne by the name of *Fitz-Geffrey*.

5. "Sable, three Nags Heads erased Argent;"

borne by the right hon. and the reverend Charles-Talbot Blayney, baron Blayney of Monaghan, in Ireland. This noble family is descended in a direct line from Cadwallader, a younger son of the prince of Wales; and the first peer was Sir Edward Bleyney, knight, who was created a baron by king James I. July 29, 1621.

6. "Argent, three Boars Heads erased and erect Sable, langued Gules;" for the name of *Booth*; and borne by Sir George Booth, bart. the present rector of Ashton-under-Line, in the county of Lancaster.—Various are the traditions touching the original stem of this ancient family, which, like most others of long standing, is so ingulfed in the obscurity of all-devouring time, that no other light than conjecture is now to be had thereof. The most probable is, that their beginning was at a certain place called the *Booths*, in the county of Lancaster, where being seated, they were thence surname, as the manner of those ages was to style men from the places where they lived.

7. "Azure, three Boars Heads erased Or;" quartered by his grace Alexander Gordon duke of Gordon, &c. Of this great and noble family, which took their surname from the barony of Gordon in the county of Berwick, there have been, besides those in North-Britain, several of great distinction in Muscovy; and in the time of king Malcolm IV. 1160, this family was very numerous, and flourished in the county aforesaid.

8. "Argent, three Bulls Heads erased, Sable, armed Or;" borne by the right hon. Clotworthy Skeffington, earl of Massarene, &c. of Ireland. This ancient and noble family derives its name from the village of Skeffington, in the county of Liecester, of which place Simon Skeffington was Lord in the reign of Edward I. and from him descended Sir William Skeffington, knt. made so by king Henry VII.

9. "Argent, two Foxes counter-saliant, the dexter surmounted of the sinister Gules;" for the name of *Kadrod-Hard*, an ancient British family, from which is descended Sir Watkyn-Williams Wynne, bart. who bears this quartered, second and third, in his coat-of-arms.

10. "Argent, three Bulls passant Sable, armed and unguled Or;" for Ashley, and quartered by the right hon. Anthony-Ashley Cooper, earl of Shaftesbury, &c. This noble earl is descended from Richard Cooper, who flourished in the reign of king Henry VIII. and purchased the manor of Paulet in the county of Somerset; of which the family are still proprietors. But his ancestor, who makes the greatest figure in history, is Sir Anthony-Ashley Cooper, who was created baron Ashley of Winbourn, April 20, 1661, and afterwards earl of Shaftesbury, April 23, 1672.

11. "Ermine, three Cats passant in Pale Argent;" for the name of *Adams*; and borne by Sir Thomas Adams, bart. a captain of his majesty's navy, who commanded several different ships in the last war with bravery and conduct.

12. "Gules, two Greyhounds rampant Or, respecting each other;" borne by the name of *Dogget*.

13. "Or, an Als's Head erased Sable;" borne by the name of *Hackwell*.

14. "Gules, three Lions gambes erased Argent;" for the name of *Newdigate*, and borne by Sir Roger New-

Fig. xvi:

Birds,
Fishes, &c.

Newdigate, bart. LL.D. and representative in the present and three last parliaments for the university of Oxford.

15. "Argent, three lions tails crested and erased Gules;" borne by the name of *Cork*.

16. "Azure, a Buck's Head cabossed Argent;" borne by the right hon. William Legge, earl of Dartmouth, &c. This noble earl is descended from Signior de Lega, an Italian nobleman, who flourished in Italy in the year 1297. What time the family came into England is uncertain; but it appears they were settled at Legge-place, near Tunbridge in Kent, for many generations; and Thomas, one of their ancestors, was twice lord-mayor of London, viz. in 1346 and 1353.

17. "Argent, two Squirrels sejant adorsed Gules," for the name of *Samwell*; and borne by Sir Thomas Samwell, bart. of Upton, in Northamptonshire, who is lineally descended from the ancient family of the Samwells in Cornwall.

18. "Gules, a Goat passant Argent;" borne by the name of *Baker*.

19. "Sable, a Stag standing at gaze Argent;" borne by the name of *Jones*, of Monmouthshire.

20. "Azure, three Holy-Lambs Or;" borne by the name of *Row*.

V. Examples of Birds, Fishes, Reptiles, &c.

Fig. xvii.

1. "Ermine, an Eagle displayed Sable;" borne by the name of *Beddingfield*.

2. "Gules, a Swan close proper;" borne by the name of *Leigham*.

3. "Argent, a Stork Sable, membred Gules;" borne by the name of *Starkey*.

4. "Gules, a Pelican in her nest with wings elevated, feeding her young ones Or; vulned proper;" borne by the name of *Carne*.

5. "Argent, three Peacocks in their pride proper;" borne by the name of *Pawne*.

6. "Sable, a Goshawk Argent, perching upon a stock in the Base point of the Escutcheon of the second, armed, jessed, and belled Or;" borne by the name of *Weele*.

7. "Or, a Raven proper;" borne by the name of *Corbet*.

8. "Argent, three Cocks Gules, crested and jow-lapped Sable, a Crescent surmounted of a Crescent for difference, borne by the right hon. Charles Cockayne, viscount Cullen, of Donegal in Ireland. Of this ancient family was Andreas Cockayne, of Ashburne in the county of Derby, who lived in the 28th year of Edward I. Charles, son to Sir William Cockayne, lord-mayor of London, 1619, was the first who was advanced to the Peerage, by Charles I. August 11, 1642.

9. "Sable a Dolphin naiant embowed Or;" borne by the name of *Symonds*. This animal is borne by the eldest son of the French king, and next heir to the crown, no other subject in that kingdom being permitted to bear it. In England, where that rule cannot take place, there are several families that have dolphins in their coats-of-arms.

10. "Argent, three Whales Heads erect and erased Sable;" borne by the name of *Whalley*.

11. "Gules, three Escallops Argent;" borne by the right hon. George Keppel, earl of Albemarle, &c. This present earl is descended from Arnold Joost,

van Keppel, a nobleman of the province of Gelderland in Holland, who came over into England with the prince of Orange in 1688, to whom he was then a page of honour, and afterwards master of the robes, and was by him created a peer of England, by the title of earl of Albemarle, in the duchy of Normandy in France, February 10. 1696.

12. "Azure, three Trouts fretted in Triangle Argent;" borne by the name of *Troutbeck*.

13. "Vert, a Grasshopper passant Or."

14. "Azure, three Bees two and one volant in pale Argent;" borne by the name of *Bye*.

15. "Vert, a Tortoise passant Argent;" borne by the name of *Gawdy*.

16. "Gules, an Adder nowed Or;" borne by the name of *Nathiley*. Adders, snakes, and serpents are said to represent many things, which being according to the fancy of the ancients, and a few modern authors who have adopted their opinions, it is needless to enlarge upon. It is certain they often occur in armory; but the noblest is that of the duchy of Milan, viz.

"Argent, a Serpent gliding in Pale Azure, crowned Or, vorant an Infant issuing Gules." The occasion of this bearing was thus: Otho, first viscount of Milan, going to the Holy-land with Godfrey of Bouillon, defeated and slew in a single combat the great giant Volux, a man of an extraordinary stature and strength, who had challenged the bravest of the Christian army. The viscount having killed him, took his armour, and among it his helmet, the crest whereof was a serpent swallowing an infant, worn by him, to strike a terror into those who should be so bold as to engage him.

17. "Ermine, a Rose Gules barbed and seeded proper;" borne by the right hon. Hugh Boscawen viscount Falmouth, &c. This noble lord is descended from Richard Boscawen, of the town of Boscawen, in the county of Cornwall, who flourished in the reign of king Edward VI. Hugh, the late viscount, and the first peer of this ancient family, was created baron of Boscawen-Rose, and viscount Falmouth, on the 13th of June, 1720, 6th of George I.

18. "Azure, three Laurel-leaves slipped Or;" borne by the name of *Leveson*, and quartered by the right hon. Granville-Leveson Gower, earl of Gower, &c.

19. "Azure, three Garbs Or;" borne by the name of *Cuming*. These are sheaves of wheat; but though they were barley, rye, or any other corn whatsoever, it is sufficient, in blazoning, to call them *Garbs*, telling the tincture they are of.

20. "Gules, three Cinquefoils Argent;" borne by the right hon. lord Ford Lambart, baron of Cavan, &c. in Ireland. Of this ancient family, which is of French extraction, was Sir Oliver, who, in the reign of queen Elizabeth, attending the earl of Essex to Spain, was there knighted by him; and afterwards returning with that earl into Ireland, was, for his singular service in the north against O'Neal earl of Tyrone, made camp-master general, and president of Connaught; and February 17. 1617, was created lord Lambart and baron of Cavan, by king James I.

It must be observed that trees and plants are sometimes said to be trunked, eradicated, fructuated, or raguled, according as they are represented in arms.

ART.

Reptiles,
Plants, &c.

ART. 2. Of ARTIFICIAL FIGURES borne in Coats-of-arms.

AFTER the various productions of nature, artificial figures, the objects of arts and mechanics, claim the next rank. They may be distributed into the following classes, viz.

Warlike instruments, as swords, arrows, battering-rams, gauntlets, helmets, spears, pole-axes, &c.

Ornaments used in royal and religious ceremonies, as crowns, coronets, mitres, wreaths, crofters, &c.

Architecture, as towers, castles, arches, columns, plummets, battlements, churches, portcullises, &c.

Navigation, as ships, anchors, rudders, pendants, sails, oars, masts, flags, galleys, lighters, &c.

All these bearings have different epithets, serving either to express their position, disposition, or make, viz. Swords are said to be erect, pommeled, hilted, &c. Arrows, armed, feathered, &c. Towers, covered, embattled, &c.; and so on of all others, as will appear by the following examples.

Fig. xviii.

1. "Sable, three swords, their points meeting in the Base Argent, pommeled and hilted Or, a Crescent in chief of the second for difference;" borne by his grace Charles Powlet, duke of Bolton, &c. This noble duke is descended from Hercules, lord of Tournon in Picardy, who came over to England with Jeffrey Plantagenet earl of Anjou, third son of king Henry II. and among other lands had the lordship of Paulet in Somersetshire conferred on him. William Powlet, the first peer of this illustrious and loyal family, was treasurer of the household to king Henry VIII. and by him created baron St. John of Basing, in the county of Southampton, March 9. 1538.

2. "Argent, three Battering-rams barways in Pale, headed azure and hooped Or, an Annulet for difference;" borne by the right hon. Willoughby Bertie, earl of Abington, &c. The first of the family of Bertie that bore the title of earl of Abington, was James Bertie lord Norris of Rycote, being created earl, November 30. 1682, by Charles II.

3. "Azure, three left-hand Gauntlets with their backs forward Or;" borne by the right hon. Thomas Fane, earl of Westmoreland, &c. This noble earl is descended from the Fanes, an ancient family which resided at Badſal in Kent, from which descended Francis Fane, son and heir of Sir Thomas Fane, knight, by Mary his wife, sole daughter and heiress to Henry Nevil lord Abergavenny, afterwards created baroness Despenſer. The said Francis was a knight of the Bath; and in the reign of king James I. was created baron Burgherſh, and earl of Westmoreland, December 29. 1624.

4. "Azure, three Arrows their points in base Or;" borne by the right hon. Thomas Archer, lord Archer, &c. This noble lord is descended from John de Archer, who came over from Normandy with William the Conqueror; and this family is one of the most ancient in Warwickshire, being settled at Umberſlade, in that county, ever since the reign of Henry II. His lordship is the first peer; and was created lord Archer and baron of Umberſlade by king George II. July 14. 1747.

5. "Gules, two helmets in chief proper, garnished Or, in a Base of a Garb of the third;" borne by

the right hon. George Cholmondeley, earl of Cholmondeley, &c. This noble earl is descended from the ancient family of Egerton in Cheshire, which flourished in the time of the conquest, from whom also the duke of Bridgewater is descended. The first English peer of this branch was Hugh, viscount Cholmondeley of Kells, in Ireland, who, joining with those who opposed the arbitrary measures of king James II. was on the accession of king William and queen Mary, created lord Cholmondeley of Namptwich, in the county of Chester.

6. "Argent, a Ship with its Sails furled up Sable;" quartered by the right hon. James Hamilton, earl of Abercorn, &c. The descent of this noble family is from that of the duke of Hamilton: for James, the fourth lord Hamilton and second earl of Arran, marrying lady Margaret Douglas, daughter of James the third earl of Morton, by her had four sons, James, John, Claud, and David; whereof Claud was progenitor of the lord we are now speaking of; and in consideration of his merit and loyalty to Mary queen of Scots, James VI. created him lord Paisley in 1591, as also earl of Abercorn, baron of Hamilton, &c. July 10. 1606.

7. "Or, an Anchor in pale Gules;" quartered by the most noble George Johnſton, marquis of Annandale, &c. The Johnſtons are an ancient and warlike family, and derive their surname from the barony of Johnſton in Annandale.

8. "Sable, three Spears Heads erect Argent, imbued Gules, on a chief Or, as many Pole-axes Azure;" borne by the right hon. William King, lord King, &c. Peter King, esq; the first lord of this ancient family, was chosen recorder of the city of London, July 27. 1708, and on the 12th of September following had the honour of knighthood conferred on him. He was constituted lord-chief-justice of the common-pleas in the first year of king George I. 1714; on the 5th of April following was sworn of his majesty's most hon. privy council; and on May 19. 1723, was created a peer of this kingdom by the title of lord King, baron of Ockham.

9. "Gules, three Clarions Or;" quartered by the right hon. Robert Carteret, earl of Granville, &c. This ancient and worthy family derives its pedigree from Offerey de Carteret, who attended William the Conqueror in his descent upon England, and contributed to the victory he obtained over king Harold, at Haſtings in Suffex, 1066, he had manors and lands in England conferred on him by that prince, as a reward for his eminent services. George Carteret, grandfather to the present earl, was, in consideration of his own merit and the services of his ancestors, created a peer of Great Britain, October 19th 1681.

10. "Argent, a Maunch Sable;" borne by the right hon. Francis Haſtings, earl of Huntingdon, &c. This noble earl is descended from Hugh de Haſtings, a younger son of the ancient and noble family of the Haſtings, earl of Pembroke, of which family was William de Haſtings, steward of the household to king Henry I.—William, the first lord Haſtings, was created a baron on July 6, 1461, by king Edward IV.

11. "Azure, a circular Wreath Argent and Sable, with four Hawk's Bells joined thereto in quadrature Or;"

Or;" borne by the right hon. Robert Jocelyn, viscount Jocelyn, &c. This noble family is of great antiquity; for, after the Romans had been masters of Britain 500 years, wearied with the wars, they took their final farewell of it, and carried away with them a great many of their brave old British soldiers, who had served them in their wars both at home and abroad, to whom they gave Amorica in France, for their former services, which country was from them afterwards called *Little Britain*. It is supposed that there were some of this family amongst them; and that they gave the name of *Jocelyn* to a town in this country, which still preserves that name: and it is thought probable that they returned with William the Conqueror; for we find, in 1066, mention made of Sir Gilbert Jocelyn. This present nobleman, the first lord of the family, was created baron Newport, of Newport in Ireland, on November 29, 1743, and viscount in November 1751.

12. "Gules, three Powers Argent;" quartered by the right hon. William Fowler, viscount Ashbrook, &c. William Fowler, esq; father to this present lord, was advanced to the peerage by king George II. and created baron of Castle-Durrow, in the county of Kilkenny, October 27, 1733, and his son was created viscount Ashbrook, of Ashbrook in Ireland, on Sept. 30, 1751, now extinct.

13. "Gules, two keys in Saltier Argent, in Chief a Royal Crown proper;" the arms of the archbishopric of York. This archbishopric comprehends only the bishoprics of Carlisle, Chester, and Durham. And the diocese contains about three parts in four of Yorkshire, all Nottinghamshire, and Hexham peculiar jurisdiction; divided into 903 parishes and chapels; and into four archdeaconries, of York, East-Riding, Cleveland, and Nottingham.

14. "Gules, two Swords in Saltier Argent, pomeled and hilted Or;" the arms of the bishopric of London. This diocese contains London, the counties of Middlesex and Essex, and part of Hertfordshire, in which there are about 665 churches and chapels. In it are also five archdeaconries, viz. those of London, Middlesex, Essex, Colchester, and St Albans.

15. "Sable, a Key in Bend, surmounted by a Crozier in Bend sinister, both Or;" the arms of the bishopric of St Asaph. This diocese contains no one whole county; but part of Denbigh, Flint, Montgomery, and Merioneth shires, and some towns in Shropshire, wherein are to the number of 121 parishes; but there are in all 131 churches and chapels, most of which are in the immediate patronage of the bishops. It hath but one archdeaconry, called of *St Asaph*, which is united to the bishopric, for the better support of it.

16. "Gules, two Keys adosce in Bend, the uppermost Argent, the other Or, a Sword interposed between them in Bend sinister of the second, pomeled and hilted of the third;" the arms of the bishopric of Winchester. This diocese contains the whole county of Southampton, with the Isle of Wight, and the isles of Jersey, Guernsey, Sark, and Alderney. It also contains one parish in Wiltshire, and all Surry, except eleven peculiars belonging to Canterbury. The number of churches and chapels in it are 415;

and it has two archdeacons, viz. of Winchester and Surry.

17. "Gules, three Mitres with their pendants Or;" the arms of the bishopric of Chester. The bishopric of Chester was anciently part of the diocese of Litchfield; one of whose bishops, removing his see hither in the year 1075, occasioned his successors being frequently called *bishops of Chester*. But it was not erected into a distinct bishopric till the year 1541, by king Henry VIII. It contains the entire counties of Chester and Lancashire; part of Westmoreland, Cumberland, and Yorkshire; two chapels in Denbighshire, and five churches and chapels in the county of Flint: in all, 506 churches and chapels. It is divided into two archdeaconries, viz. Chester and Richmond.

18. "Sable, three Ducal Coronets paleways Or;" the arms of the bishopric of Bristol. The bishopric of Bristol was founded by king Henry VIII. and taken out of the dioceses of Salisbury, Wells, and Worcester. It contains the city of Bristol, and the county of Dorset; in which there are 276 churches and chapels; and one archdeaconry, viz. that of Dorset.

19. "Gules, a Sword erect in pale Argent, pomeled and hilted Or, surmounted by two Keys in Saltier of the last;" the arms of the bishopric of Exeter. When Christianity was first planted in these parts, Cornwall and Devonshire were placed under the jurisdiction of the bishop of Dorchester; but, that episcopal seat being removed to Winchester in the year 660, these western parts were made subject to that new see. When the monastery of Sherborn was turned into a cathedral about the year 705, these counties were included in that diocese, which continued about 200 years; and then Plegmund, archbishop of Canterbury, at the command of king Edward the Elder, erected three new bishoprics; one at Wells, for Somersetshire; another at Bodmin, for Cornwall; and the last at Tawton-Bishops, for Devon, which was after removed to Crediton, and at length settled at Exeter. That diocese contains the entire counties of Devon and Cornwall; in which there are 725 churches and chapels, and four archdeaconries, viz. those of Exeter, Barnstable, Totness, and Cornwall.

20. "Gules, three Ducal Coronets, Or;" the arms of the bishopric of Ely. The bishopric of Ely was taken from that of Lincoln by king Henry I. anno 1109. It contains all Cambridgeshire, and the isle of Ely, excepting Ilesham, which belongs to the see of Rochester, and 15 other parishes that are in the diocese of Norwich: but it has one parish, viz. Emeth, in Norfolk. The whole number of the churches and chapels within the diocese of Ely are 164. It hath only one archdeacon, viz. that of Ely.

ART. III. Of CHIMERICAL FIGURES.

THE last and the oddest kind of bearings in coats-of-arms, is comprehended under the name of *chimerical figures*; that is to say, such as have no real existence, but are mere fabulous and fantastical inventions. These charges, griffons, martlets, and unicorns excepted, are so uncommon in British coats, that in order to make up the same number of examples hitherto contained in each collection, several foreign bearings are introduced here;

HERALDRY

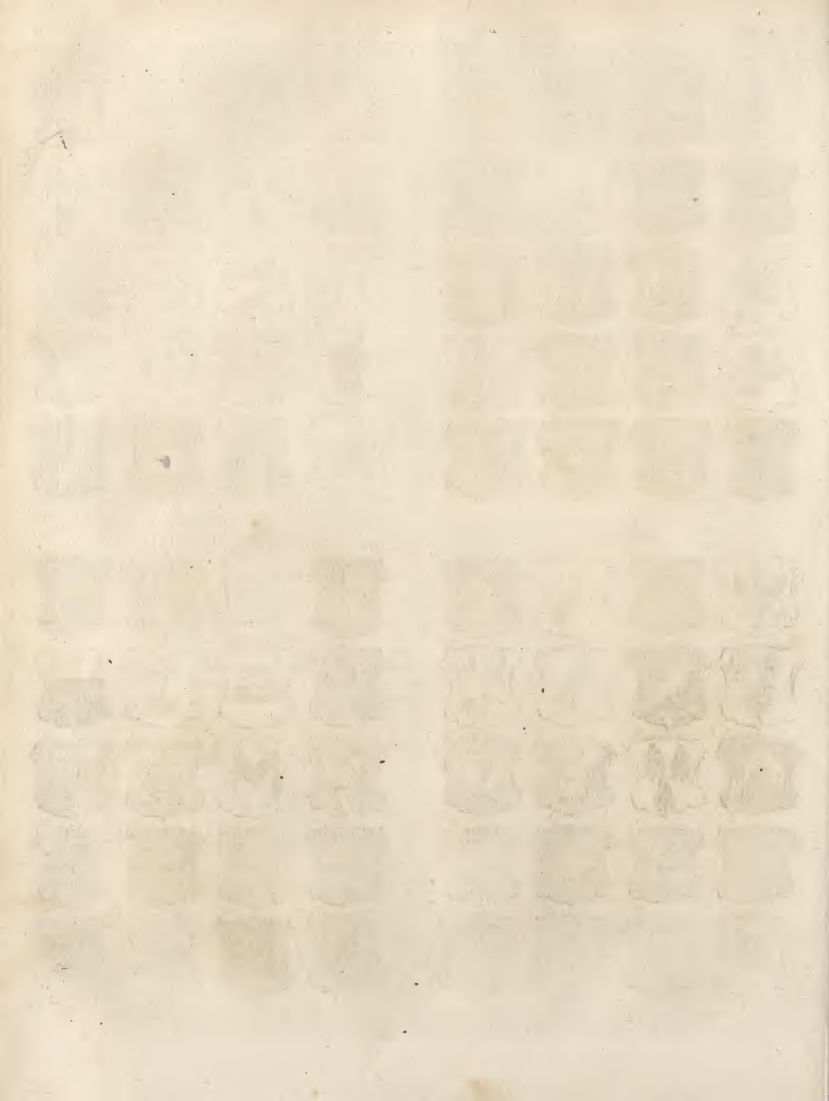


Pl. 17.
Birds &c.



Pl. 18.
ARTIFICIAL FIGURES.





here; which, however, as they are conformable to the laws of heraldry, will also contribute both to entertain and instruct the reader. Those most in use are the following, viz.

Angels, Cherubim, Tritons, Centaurs, Martlets, Griffons, Unicorns, Dragons, Mermaids, Satyrs, Wiverns, Harpies, Cockatrices, Phoenixes.

These, like the foregoing charges, are subject to various positions and dispositions, which, from the principles already laid down, will be plainly understood. See the examples, fig. xix.

Nº 1. is "Gules, an Angel standing affrontée, with his hands conjoined and elevated upon his breast, habited in a long Robe close girt Argent, his Wings displayed Or;" borne by the name of *Brangor de Cerevisia*, a foreign prelate, who assisted at the council of Constance 1412. This example is quoted by Guillim, Sect. III. Chap. i.

2. "Sable, a Cheveron between three Cherubim Or;" borne by the name of *Chaloner*, of Yorkshire and Cheshire.

3. "Azure, a Fess indented between three Cherubim Argent." These arms were granted to John Ayde, esq; of Doddington in Kent, by Sir William Segar, garter.

4. "Gules, a Cherub having three pair of Wings, the uppermost and lowermost counter-crossed Saltierways, and the middlemost displayed Argent;" borne by the name of *Buocafoco*, a foreign prelate. This example is copied from Menestrier's *Méthode du Blason*, p. 120, Nº viii.

5. "Azure, a Griffon segreant Or, armed and langued Gules, between three Crescents Argent;" quartered by the right hon. John Bligh, lord Clifton, &c. The great grandfather of this noble lord, who lived in London, going over to Ireland in the time of Oliver Cromwell, as an agent to the adventurers there, acquired a good estate, and laid the foundation for the grandeur of this family.

6. "Gules, three Martlets Or;" borne by the name of *Macgill*. Guillim observes, that this bird, which is represented without feet, is given for a difference to younger brothers, to put them in mind, that, in order to raise themselves, they are to trust to their wings of virtue and merit, and not to their legs, having but little land to set their feet on.

7. "Azure, three Mulletts Argent within a double Tressure counter-flowery Or, in the centre a Martlet of the last;" borne by the right hon. Patrick Murray, lord Elibank. Sir Gideon Murray, knighted by king James VI. by whom he was made treasurer-depute, was third son of Sir Andrew Murray of Blackbarony. His son Patrick, in respect of his loyalty to Charles I. was, on May 16. 1628, made a baronet, and, in 1643, created lord Elibank.

8. "Sable, a Cockatrice displayed Argent, crested, membred, and jowllowed Gules."

9. "Argent, a Mermaid Gules, crined Or, holding in her right hand a Comb, and in her left a Mirror, both proper;" borne by the name of *Eliis*.

10. "Argent, a Wivern, his Wings elevated, and his Tail nowed below him Gules;" borne by the name of *Drakes*.

11. "Or, a Dragon passant Vert."

12. "Gules, a Centaur or Sagittary in full speed Vol. V.

regardant proper." This was the coat-of-arms of Stephen, surnamed of *Blois*, son to Adela daughter of William the Conqueror, and of Stephen earl of Blois; and on this descent grounding his pretension to the crown of England, he was proclaimed king in 1135, and reigned to the 25th of October 1154.

13. "Argent, an Unicorn sejant Sable, unguled and horned Or;" borne by the name of *Harling*.

14. "Argent, a Dragon's Head erased Vert, holding in his Mouth a sinister Hand couped at the Wrist Gules;" borne by the name of *Williams*.

15. "Gules, three Unicorns Heads couped Or;" borne by the name of *Paris*.

16. "Argent, a Wivern volant Bendways Sable;" borne by the name of *Raynon*.

17. "Azure, a Lion sejant guardant winged Or, his Head encircled with a Glory, holding in his forepaws an open Book, wherein is written, *Pax tibi, Marce, Evangelista meus*; over the dexter side of the Book a Sword erect, all proper." These are the arms of the republic of Venice.

18. "Azure, a Bull salient and winged Or;" borne by the name of *Cadenet*, a family of distinction in Provence.

19. "Argent, a Wyvern with a human Face affrontée hooded, and winged Vert;" borne by the name of *Bafraghi*, an ancient and noble family of Luques.

20. "Azure, a Harpy displayed, armed, crined, and crowned Or." These are the arms of the city of Noremberg in Germany.

To the forementioned figures may be added the montegre, an imaginary creature, supposed to have the body of a tyger with a Satyr's head and horns; also those which have a real existence, but are said to be endowed with extravagant and imaginary qualities, viz. the salamander, beaver, camelion, &c.

C H A P. IV.

Of the EXTERNAL ORNAMENTS of ESCUTCHEONS.

THE ornaments that accompany or surround escutcheons were introduced to denote the birth, dignity, or office, of the persons to whom the coat-of-arms appertaineth; which is practised both among the laity and clergy. Those most in use are of ten sorts, viz. Crowns, Coronets, Mitres, Helmets, Mantling, Chapeaux, Wreaths, Crests, Scrolls, Supporters.

SECT. I. Of Crowns.

THE first crowns were only diadems, bands, or fillets; afterwards they were composed of branches of divers trees, and then flowers were added to them.

Among the Greeks, the crowns given to those who carried the prize at the Isthmian games, were of pine; at the Olympick, of laurel; and at the Nemean, of smalage.

The Romans had various crowns to reward martial exploits and extraordinary services done to the republic: for which see the detached article Crown in this Dictionary, and Plate LXXXII.

Examples of some of these crowns are frequently
20 P met

Crowns.

met with in modern achievements, viz. 1. The *mural* crown in that of lord Montfort, which was conferred on Sir John Bromley, one of his lordship's ancestors, as an augmentation to his arms, for his great courage at the battle of Le Crobey. Part of the crest of lord Archer is also a mural crown. And there are no less than ten English baronets, whose arms are ornamented with the same crown. 2. The *naval* or *rostral* crown, is still used with coats-of-arms, as may be seen in those of Sir William Burnaby, bart. now admiral of the red squadron, and of John Clerke, esq; as part of their crests. 3. Of the *castræse* or vallary crown, we have instances in the coat-of-arms of Sir Reginald Graham, and of Isaac Akerman, esq. 4. The crest of Grice Blakeney, esq; is encompassed with a *cirole* crown. 5. The *radiated* crown, according to J. Yorke, was placed over the arms of the kings of England, till the time of Edward III. It is still used, as a crest, on the arms of some private families; those, for example, borne by the name of *Whitfield*, are ornamented with it. The celestial crown is formed like the radiated, with the addition of a star on each ray; and is only used upon tomb-stones, monuments, and the like.—Others of the ancient crowns are still borne, as crests, by the right hon. Jeffrey Amherst, baron Amherst of Holmesdale, in Kent; Sir James Gray, bart.; Thomas Sheriff, esq; and others.

But modern crowns are only used as an ornament, which emperors, kings, and independent princes set on their heads, in great solemnities, both to denote their sovereign authority, and to render themselves more awful to their subjects. These are the most in use in heraldry, and are as follows:

The imperial crown, (n^o 1.) is made of a circle of gold, adorned with precious stones and pearls, heightened with fleurs-de-lis, bordered and feeded with pearls, raised in the form of a cap voided at the top, like a crescent. From the middle of this cap rises an arched fillet enriched with pearls, and surmounted of a mound, whereon is a cross of pearls.

The crown of the kings of Great Britain (2.), is a circle of gold, bordered with ermine, enriched with pearls and precious stones, and heightened up with four crosses pattee and four large fleurs-de-lis alternately; from these rise four arched diadems adorned with pearls, which close under a mound, surmounted of a cross like those at bottom. Mr Sandford, in his *Genealogical History*, p. 381. remarks, that Edward IV. is the first king of England that in his seal, or on his coin, is crowned with an arched diadem.

The crown of the kings in France (3.) is a circle enamelled, adorned with precious stones, and heightened up with eight arched diadems, rising from as many fleurs-de-lis, that conjoin at the top under a double fleur-de-lis, all of gold.

The crowns of Spain, Portugal, and Poland, are all three of the same form, and are, amongst others, thus described by colonel Parsons, in his *Genealogical Tables of Europe*, viz. A ducal coronet, heightened up with eight arched diadems that support a mound, ensigned with a plain cross. Those of Denmark and Sweden are both of the same form; and consist of eight arched diadems, rising from a marquise's coronet, which that conjoin at the top under a mound ensigned with a

cross-bottony.

The crowns of most other kings are circles of gold, adorned with precious stones, and heightened up with large trefails, and closed by four, six, or eight diadems, supporting a mound, surmounted of a cross.

The Great Turk (4.), bears over his arms a turband, enriched with pearls and diamonds, under two coronets, the first of which is made of pyramidal points heightened up with large pearls, and the uppermost is surmounted with crescents.

The Pope, or bishop of Rome, appropriates to himself a Tiara (n^o 5.), or long cap of golden cloth, from which hang two pendants embroidered and fringed at the ends, *semée* of crosses of gold. This cap is inclosed by three marquise's coronets; and has on its top a mound of gold, whereon is a cross of the same, which cross is sometimes represented by engravers and painters pommetted, recroffed, flowery, or plain.—It is a difficult matter to ascertain the time when these haughty prelates assumed the three forementioned coronets. A patched up succession of the holy pontiffs, engraved and published a few years ago by order of Clement XIII. the late Pope, for the edification of his good subjects in Great Britain and Ireland, represents Marcellus, who was chosen bishop of Rome anno 310, and all his successors, adorned with such a cap: but it appears, from very good authority, that Boniface VIII. who was elected into the see of Rome anno 1295, first compassed his cap with a coronet; Benedict XII. in 1335, added a second to it; and John XXIII. in 1411, a third; with a view to indicate by them, that the Pope is the sovereign priest, the supreme judge, and the sole legislator amongst Christians.

SECT. II. Of Coronets.

THE Coronet of the prince of Wales, or eldest son of the king of Great Britain, (n^o 7.) was anciently a circle of gold set round with four crosses-pattee, and as many fleurs-de-lis alternately; but since the restoration, it has been closed with one arch only, adorned with pearls, and surmounted of a mound and cross, and bordered with ermine like the king's.

Besides the aforesaid coronet, his royal highness the prince of Wales has another distinguishing mark of honour, peculiar to himself, called by the vulgar the *prince's arms*, viz. A plume of three ostrich-feathers, with an ancient coronet of a prince of Wales. Under it, in a scroll, is this motto, *Ich Dien*, which in the German or old Saxon language signifies "I serve;" (see n^o 6.) This device was at first taken by Edward prince of Wales, commonly called the *black prince*, after the famous battle of Cressy, in 1346, where having with his own hand killed John king of Bohemia, he took from his head such a plume, and put it on his own.

The coronet of the present dukes of Gloucester and Cumberland, and of all the immediate sons and brothers of the kings of Great Britain, is a circle of gold, bordered with ermine, heightened up with four fleurs-de-lis, and as many crosses-pattee alternate, (see n^o 8).—The particular and distinguishing form of such coronets as are appropriated to princes of the blood-royal, is described and settled in a grant of Charles II. the 13th of his reign.

The coronet of the princesses of Great Britain is a circle

Coronets.

Mitres, &c.

circle of gold, bordered with ermine, and heightened up with crosses-patee, fleurs-de-lis and strawberry leaves alternate (n^o 9.); whereas a prince's coronet has only fleurs-de-lis and crosses.

A duke's coronet is a circle of gold, bordered with ermine, enriched with precious stones and pearls, and set round with eight large strawberry or parsley leaves; (n^o 10).

A marquis's coronet is a circle of gold, bordered with ermine, set round with four strawberry leaves, and as many pearls on pyramidal points of equal height, alternate; (n^o 11).

An earl's coronet is a circle of gold, bordered with ermine, heightened up with eight pyramidal points or rays, on the tops of which are as many large pearls, and are placed alternately with as many strawberry-leaves, but the pearls much higher than the leaves; (n^o 12).

A viscount's coronet differs from the preceding ones as being only a circle of gold bordered with ermine, with large pearls set close together on the rim, without any limited number, which is his prerogative above the baron, who is limited (see n^o 13).

A baron's coronet, (n^o 14), which was granted by king Charles II. is formed with six pearls set at equal distance on a gold circle, bordered with ermine, four of which only are seen on engravings, paintings, &c. to shew he is inferior to the viscount.

The eldest sons of peers, above the degree of a baron, bear their father's arms and supporters with a label, and use the coronet appertaining to their father's second title; and all the younger sons bear their arms with proper differences, but use no coronets.

As the crown of the king of Great Britain is not quite like that of other potentates, so do most of the coronets of foreign noblemen differ a little from those of the British nobility: as for example, the coronet of a French earl is a circle of gold with 18 pearls set on the brim of it; a French viscount's coronet is a circle of gold only enamelled, charged with four large pearls; and a French baron's coronet is a circle of gold enamelled and bound about with a double bracelet of pearls: and these coronets are only used on French noblemen's coats-of-arms, and not worn on their heads, as the British noblemen and their ladies do at the king's coronation.

SECT. III. Of Mitres.

THE archbishops and bishops of England and Ireland place a mitre over their coats-of-arms. It is a round cap pointed and cleft at the top, from which hang two pendants fringed at both ends; with this difference, that the bishop's mitre is only surmounted with a fillet of gold, set with precious stones, (see fig. 23. n^o 6.) whereas the archbishop's issues out of a ducal coronet, (see fig. 20. n^o 15).

This ornament, with other masquerade garments, is still worn by all the archbishops and bishops of the church of Rome, whenever they officiate with solemnity; but it is never used in England, otherwise than on coats of arms, as before mentioned.

SECT. IV. Of Helmets.

THE Helmet was formerly worn as a defensive wea-

pon, to cover the bearer's head; and is now placed over a coat-of-arms as its chief ornament, and the true mark of gentility. There are several sorts, distinguished, 1st, by the matter they are made of; 2^{dly}, by their form; and 3^{dly}, by their position.

1st, As to the matter they are, or rather were, made of: The helmets of sovereigns were of burnished gold damasked; those of princes and lords, of silver figured with gold; those of knights, of steel adorned with silver; and those of private gentlemen, of polished steel.

2^{dly}, As to their form: Those of the king and the royal family, and noblemen of Great Britain, are open-faced and grated, and the number of bars serves to distinguish the bearers quality; that is, the helmet appropriated to the dukes and marquises is different from the king's, by having a bar exactly in the middle, and two on each side, making but five bars in all, (see fig. xxi. n^o 1.) whereas the king's helmet has six bars, viz. three on each side, (ibid. n^o 7.) The other grated helmet with four bars is common to all degrees of peerage under a marquis. The open-faced helmet without bars denotes baronets and knights. The close helmet is for all esquires and gentlemen.

3^{dly}, Their position is also looked upon as a mark of distinction. The grated helmet in front belongs to sovereign princes. The grated helmet in profile is common to all degrees of peerage. The helmet standing direct without bars, and the beaver a little open, denotes baronets and knights. Lastly, the side-standing helmet, with the beaver close, is the way of wearing it amongst esquires and gentlemen. See n^o 1, 2, 3, 4, and 7, inserted in fig. xxi. *Ornaments*.

SECT. V. Of Mantlings.

MANTLINGS are pieces of cloth jagged or cut into flowers and leaves, which now-a-days serve as an ornament for escutcheons. They were the ancient covering of helmets, to preserve them, or the bearer, from the injuries of the weather, as also to prevent the ill consequences of their too much dazzling the eye in action. But Guillim very judiciously observes, that their shape must have undergone a great alteration since they have been out of use, and therefore might more properly be termed *flourishings* than *mantlings*. See the examples annexed to the helmets represented in fig. xxi.

The French heralds assure us, that these mantlings were originally no other than short coverings which commanders wore over their helmets, and that, going into battles with them, they often, on their coming away, brought them back in a ragged manner, occasioned by the many cuts they had received on their heads: and therefore the more hacked they were, the more honourable they were accounted; as our colours in time of war are the more esteemed, for having been shot through in many places.

Sometimes skins of beasts, as lions, bears, &c. were thus borne, to make the bearer look more terrible; and that gave occasion to the doubling of mantlings with furs.

SECT. VI. Of Chapeaux.

A CHAPEAU is an ancient hat, or rather cap, of dignity

Wreaths,
Crests, &c.

nity worn by dukes, generally scarlet-coloured velvet on the outside lined and turned up with fur; of late frequently to be met with above an helmet, instead of a wreath, under gentlemen and noblemen's crests. Heretofore they were seldom to be found, as of right appertaining to private families; but by the grants of Robert Cooke, Clarencieux, and other succeeding heralds, these, together with ducal coronets, are now frequently to be met with in families, who yet claim not above the degree of gentlemen. See the representation of the chapeau, n^o 5. fig. xxi.

SECT. VII. Of Wreaths.

THE Wreath is a kind of roll made of two skins of silk of different colours twisted together, which ancient knights wore as a head-dress when equipped for tournaments. The colours of the silk are always taken from the principal metal and colour contained in the coat-of-arms of the bearer. They are still accounted as one of the lesser ornaments of escutcheons, and are placed between the helmet and the crest; (see fig. xxi. n^o 6). In the time of Henry I. and long after, no man, who was under the degree of a knight, had his crest set on a wreath; but this like other prerogatives, has been infringed so far, that every body now-a-days wears a wreath.

SECT. VIII. Of Crests.

THE Crest is the highest part of the ornaments of a coat-of-arms. It is called *crest*, from the Latin word *crisla*, which signifies comb or tuft, such as many birds have upon their heads, as the peacock, pheasant, &c. in allusion to the place on which it is fixed.

Crests were formerly great marks of honour, because they were only worn by heroes of great valour, or by such as were advanced to some superior military command, in order that they might be the better distinguished in an engagement, and thereby rally their men if dispersed; but they are at present considered as a mere ornament. The crest is frequently a part either of the supporters, or of the charge borne in the escutcheon. Thus the crest of the royal achievement of Great Britain is a "Lion guardant crown'd," as may be seen in fig. xxi. n^o 7. The crest of France is "a double Flower-de-luce." Out of the many crests borrowed from supporters, are the following, viz. The duke of Montagu's, "A Griffon's head coup'd Or, back'd and wing'd Sable;" the marquis of Rockingham's, "A Griffon's head Argent, gorg'd with a ducal coronet;" the earl of Westmoreland's, "a Bull's head Argent, py'd Sable, armed Or;" and lord Archer's, which is, "Out of a mural crown Or, a Wyvern's head Argent." There are several instances of crests that are relative to alliances, employments, or names; and which on that account have been changed.

SECT. IX. Of the Scroll.

THE Scroll is the ornament placed above the crest, containing a motto, or short sentence, alluding thereto, or to the bearings; or to the bearer's name, as in the two following instances. The motto of the noble earl of Cholmondeley is, *Cassii tutissima virtus*; i. e. "Virtue is the safest helmet;" on account of helmets in the coat-of-arms. The motto of the right hon. lord Portefcuc is, *Fortē scutum salus ducum*; i. e. "A strong shield is the safety of the commanders;"

alluding to the name of that ancient family. Sometimes it has a reference to neither, but expresses something divine or heroic; as that of the earl of Scarborough, which is, *Murus arcus confectio sana*; i. e. "A good confectio is a wall of brass." Others are enigmatical; as that of the royal achievement, which is *Dieu et mon droit*, i. e. "God and my right;" introduced by Edward III. in 1340, when he assumed the arms and title of king of France, and began to prosecute his claim, which occasioned long and bloody wars, fatal, by turns, to both kingdoms: or that of the prince of Wales, which is *Ich Dien*, "I serve," the origin of which has been already mentioned. Mottos, though hereditary in the families that first took them up, have been changed on some particular occasions, and others appropriated in their stead, instances of which are sometimes met with in the history of families.

SECT. X. Of Supporters.

SUPPORTERS are figures standing on the scroll, and placed at the side of the escutcheon; they are so called, because they seem to support or hold up the shield. The rise of supporters is, by F. Menellier, traced up to ancient tournaments, wherein the knights caused their shields to be carried by servants or pages under the disguise of lions, bears, griffons, blackamoors, &c. who also held and guarded the escutcheons, which the knights were obliged to expose to public view for some time before the lists were opened. Sir George Mackenzie, who dissents from this opinion, says, in his *Treatise on the Science of heraldry*, chap. xxxi. p. 93. "That the first origin and use of them was from the custom which ever was, and is, of leading such as are invested with any great honour to the prince who confers it: thus, when any man is created a duke, marquis, or knight of the garter, or any other order, he is supported by, and led to the prince betwixt two of the quality, and so receives from him the symbols of that honour; and in remembrance of that solemnity, his arms are thereafter supported by any two creatures he chooseth." Supporters have formerly been taken from such animals or birds as are borne in the shields, and sometimes they have been chosen as bearing some allusion to the names of those whose arms they are made to support. The supporters of the arms of Great Britain, since king James the first's accession to the throne, are a *Lion rampant guardant crowned Or*, on the dexter side, and an *Unicorn Argent, crowned, armed, unguled, maned and gorged with an antique Crown, to which a chain is affixed, all Or*, on the sinister; as it appears by fig. xxi. n^o 7.

This last figure represents the coat-of-arms of the king of Great Britain, or the royal achievement, as it has been marshalled since the accession of king George I. in 1714, and is blazoned as follows, viz.

ARMS. *Quarterly, in the first grand quarter Gules, three Lions rampant guardant in pale Or*, the imperial ensigns of England; *in pale with Or, a Lion rampant, within a double tressure flory and counter-flory Gules*, the royal arms of Scotland. *The second is Azure, three Fleurs-de-lis Or*, the arms of France. *The third is Azure, a Harp Or, stringed Argent*, the ensign of Ireland. *The fourth grand quarter*

Of
Supporters.

quarter is Gules, two Lions passant guardant in pale Or, for Brunswick; impaled with Or *sensé* of Hearts proper, a Lion rampant Azure, for Lunenburg; with grafted in base Gules, a Horse current Argent, for ancient Saxony; and in a shield surtout Gules, the Crown of Charlemagne Or, as arch-treasurer of the empire; the whole within a Garter, inscribed with this motto, *HONI SOIT QUI MAL Y PENSE*, as sovereign of that noble order, given by the founder king Edward III.

CREST. On a Helmet full-faced, grated and surmounted of a Crown, a Lion guardant crowned Or; the mantlings of the last, and lining Ermine.

SUPPORTERS. On the Dexter-side, a Lion rampant guardant Or, crowned as the Crest. On the Sinister-side an Unicorn Argent, crowned, armed, maned, and unguled Or, gorged with an antique Crown; a Chain affixed thereto, reflecting over the back, and passing over the hind legs of the last, both standing on a Scroll inscribed with this motto, *DIEU ET MON DROIT*, from which issue the two Royal Badges of his Majesty's chief Dominions, viz. on the Dexter-side a Rose party per Pale Argent and Gules, stalked and leaved proper, for England; and on the Sinister-side a Thistle proper, for Scotland; being so adorned by king James I. upon his succeeding to the crown of England. As king of Scotland, he bore two unicorns, as above, for his supporters; but upon the union of that kingdom with England, 1603, he introduced one of the above supporters on the sinister-side of the royal achievement, and which continues to this day.

It is to be observed, that bearing coats-of-arms supported, is, according to the heraldical rules of England, the prerogative, 1st, Of those called *nobles majores*, viz. dukes, marquises, earls, viscounts, and barons; 2^d, Of all knights of the garter, though they should be under the degree of barons; 3^d, Of knights of the Bath, who both receive on their creation a grant of supporters. And, lastly, of such knights as the king chooses to bestow this honour upon; as in the instance of Sir Andrew Fountain, who was knighted by Philip earl of Pembroke, when lord-lieutenant of Ireland, Fountain being then his secretary; and on his return to England, king William granted him supporters to his arms, viz. two Griffons Gules and Or. In Scotland, all the chiefs of clans, or names have the privilege of claiming supporters; also the baronets. But by act of parliament, 10th September, 1672, none are allowed to use either arms or supporters, under a penalty and confiscation of all moveables whereon arms are put, without the lord Lyon's authority.

C H A P. V.

Of the Rules or Laws of HERALDRY.

THE several escutcheons, tinctures, charges, and ornaments of coats-of-arms, and their various properties, being now explained; it may not be improper to subjoin such rules for blazoning the same, as the ancient usage and laws of heraldry have established amongst us.

I. The first and most general rule is, to express one's felt in proper terms, so as not to omit any thing that ought to be specified, and at the same time to be clear and concise without tautology; as in Ex. xiv.

p. 3588. and also in Ex. ix. p. 3595. wherein these expressions, *of the Field, or of the Field*, prevent the repetition of the forementioned tincture.

II. One must begin with the tincture of the field, and then proceed to the principal charges which possess the most honourable place in the shield, such as Fels, Cheveron, &c. always naming that charge first which lies next and immediately upon the field; as in Ex. xv. p. 3593.

III. After naming the tincture of the field, the honourable ordinaries, or other principal figures, you must specify their attributes, and afterwards their metal or colour, as in Ex. xvi. p. 3601.

IV. When an honourable ordinary, or some one figure, is placed upon another, whether it be a Fels, Cheveron, Crofs, &c. it is always to be named after the ordinary or figure over which it is placed, with one of these expressions, *surtout, or over-all*, as in Ex. xx. p. 3592.

V. In the blazoning of such ordinaries as are plain, the bare mention of them is sufficient; but if an ordinary should be made of any of the crooked lines mentioned above, its form must be specified; that is, whether it be Engrailed, Wavy, &c. as in Ex. i. ii. iii. &c. p. 3588.

VI. When a principal figure possesses the centre of the field, its position is not to be expressed; or (which amounts to the same thing) when a bearing is named, without specifying the point where it is placed, then it is understood to possess the middle of the shield; as in Ex. xv. p. 3602.

VII. The number of the points of mullets or stars must be specified when more than five; and also if a mullet or any other charge be pierced, it must be mentioned as such, to distinguish it from what is plain; as in Ex. xiii. and xiv. p. 3599.

VIII. When a ray of the sun, or other single figure, is borne in any other part of the escutcheon than the centre, the point it issues from must be named; as in Ex. iii. p. 3599. col. 1.

IX. The natural colour of trees, plants, fruits, birds, &c. is no otherwise to be expressed in blazoning but by the word *proper*, as in Exam. ii. vii. p. 3602.: but if discoloured, that is, if they differ from their natural colour, it must be particularized; as in Ex. i. ii. &c. p. 3600.

X. When three figures are in a field, and their position is not mentioned in the blazoning, they are always understood to be placed two above, and one below; as fig. xxii. n^o 3.

XI. When there are many figures of the same species borne in a coat-of-arms, their number must be observed as they stand, and distinctly expressed; as in Ex. i. p. 3603.

But for the better understanding of this last rule, we have inserted examples of the different dispositions of figures, wherein they are properly represented; viz.

Two may be ranged in Pale, in Fels, &c. See fig. xxii. n^o 1 and 2.

Three, may be 2 and 1, as also in bend, &c. See n^o 3 and 4.

Four, are placed 2 and 2, or cantoned, as in n^o 5.

Five, 1, 3, 1, in Crofs; or 2, 1, 2, in Saltier. See n^o 6 and 7.

Six,

Marshalling

Six, 3, 2, 1, in Pile; or 2, 2, 2, Paleways. See n^o 8 and 9.

Eight, in Orle, or on a Bordure. See n^o 10.

Nines, 3, 3, 3, Barways; or 3, 3, 2, 1, in Pile. See n^o 11 and 12.

Tens, 4, 3, 2, 1, in Pile; or else 4, 2, 4, Barways. See n^o 13 and 14.

Twelves, are placed 4, 4, 4, Barways. See n^o 15.

There are other positions called *irregular*; as for example, when three figures which are naturally placed 2 and 1, are disposed 1 and 2, &c. It must also be observed, that when the field is strewn with the same figures, this is expressed by the word *semée*: but, according to a French armorist's opinion, if the figures strewn on the field are whole ones, it must be denoted by the words *sans nombre*; whereas, if part of them is cut off at the extremities of the escutcheon, the word *semée* or *semi* is then to be used.

C H A P. VI.

Of MARSHALLING Coats-of-arms.

By *marshalling* coats-of-arms, is to be understood the art of disposing divers of them in one escutcheon, and of distributing their contingent ornaments in proper places.

Various causes may occasion arms to be thus conjoined, which J. Guillim comprises under two heads, viz. *manifest* and *obscure*.

What this learned and judicious herald means by *manifest causes* in the marshalling of coats-of-arms, are such as betoken marriages, or a sovereign's gift, granted either through the special favour of the prince, or for some eminent services. Concerning marriages, it is to be observed,

I. When the coats-of-arms of a married couple, descended of distinct families, are to be put together in one escutcheon, the field of their respective arms is conjoined Paleways, and blazoned *parted per Pale*, *Baron and Femme, two coats; first, &c.* In which case the baron's arms are always to be placed on the dexter-side, and the femme's arms on the sinister-side, as in n^o 1 and 2, and fig. xxiii. *Of arms marshallled* which are,

1. The coat-of-arms of the rev. Edward Barnard, D. D. chaplain in ordinary to his majesty, provost of Eton-college, canon of Windsor, &c. impaled with that of S. Haggatt, his late spouse.

2. The coat-of-arms of the rev. Thomas Dampier, D. D. chaplain in ordinary to his majesty, prebendary of Durham, canon of Windsor, &c. impaled with that of F. Walker, his spouse.

If a widower marry again, his late and present wife's arms are, according to G. Leigh, "to be both placed on the sinister-side, in the escutcheon with his own, and parted per Pale. The first wife's coat shall stand on the Chief, and the second on the Base; or he may set them both in Pale with his own, the first wife's coat next to himself, and his second outermost. If he should marry a third wife, then the two first matches shall stand on the Chief, and the third shall have the whole Base. And if he take a fourth wife, the must participate one-half of the Base with the third wife, and so will they they seem to be so many coats quartered." But it must be observed, that these forms of impaling are meant

of hereditary coats, whereby the husband stands in expectation of having the hereditary possessions of his wife united to his patrimony.

II. In the arms of femmes joined to the paternal coat of the baron, the proper differences by which they were borne by the fathers of such women must be inserted.

III. If a coat-of-arms that has a Bordure be impaled with another, as by marriage, then the Bordure must be wholly omitted in the side of the arms next the centre.

IV. The person that marries an heiress, instead of impaling his arms with those of his wife, is to bear them in an escutcheon placed in the centre of his shield, after the same manner as the baronet's badge is marshallled in n^o 3. and which, on account of its shewing forth his pretension to her estate, is called an *escutcheon of pretence*, and is blazoned *sur-tout*, i. e. *over-all*, as the inescutcheon borne in the fourth quarter of the royal achievement. But the children are to bear the hereditary coat-of-arms of their father and mother *quarterly*, which denotes a fixed inheritance, and so transmit them to posterity. The first and fourth quarters generally contain the father's arms, and the second and third the mother's; except the heirs should derive not only their estate, but also their title and dignity, from their mother.

V. If a maiden or dowager lady of quality marry a commoner, or a nobleman inferior to her rank, their coats-of-arms may be set aside of one another in two separate escutcheons, upon one mantle or drapery, and the lady's arms ornamented according to her title; see n^o 4 and 5, which represent the coats-of-arms of Gen. C. Montagu, and lady Elizabeth Villiers viscountess Grandison.

VI. Archbishops and bishops impale their arms differently from the fore-mentioned coats, in giving the place of honour, that is, the dexter-side, to the arms of their dignity, as it is expressed in n^o 6, which represents the coat-of-arms of Dr Philip Yonge, lord bishop of Norwich. It may be observed of the above prelates, that they thus bear their arms parted per Pale, to denote their being joined to their cathedral church in a sort of spiritual marriage.

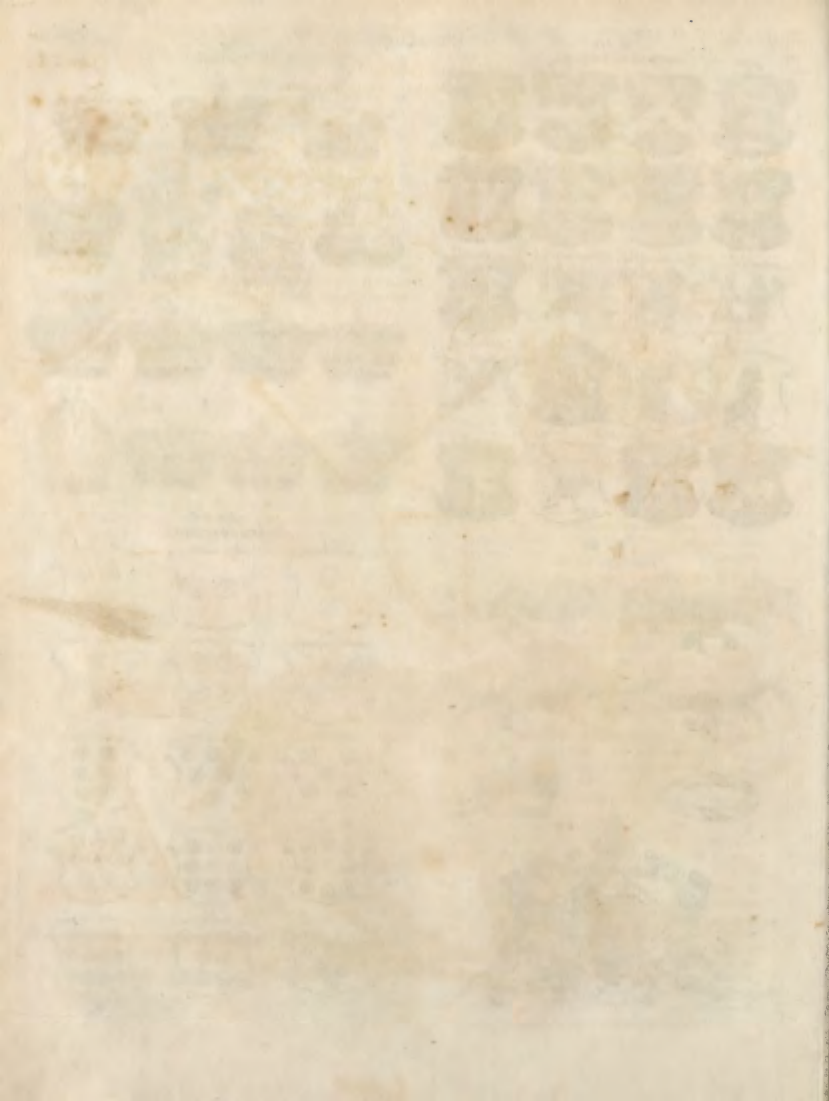
With respect to such armorial ensigns as the sovereign thinks fit to augment a coat-of-arms with, they may be marshallled various ways, as may be seen by the arms of his grace the duke of Rutland, inserted in fig. xiii. n^o 19. and the example contained in fig. xii. n^o 11.

To those augmentations may be added, 1st, The baronet's mark of distinction, or the arms of the province of Ulster in Ireland, granted and made hereditary in the male line by king James I. who erected this dignity on the 22d of May, 1611, in the 9th year of his reign, in order to propagate a plantation in the fore-mentioned province. This mark is *Argent, a sinister Hand couped at the Wrist, and erected Gules*; which may be borne either in a canton, or in an escutcheon, as will best suit the figures of the arms. See fig. xxi. n^o 3, which represents the coat-of-arms of Sir William Lorrayne, of Kirk-harle, Northumberland, and are thus blazoned: *Quarterly, Sable and Argent, a plain Cross counter-quartered of the Field.*

The

Fig. 10.
CHIEF OF FOURS.Fig. 21.
ORNAMENTS &c.Fig. 20.
CROWNS.Fig. 22.
DISPOSITIONS.

and other designs.



HERALDRY.

No. 23. ARMS MARSHALLED.

Plate CL.



Fig. 25.
Theban
HARP.



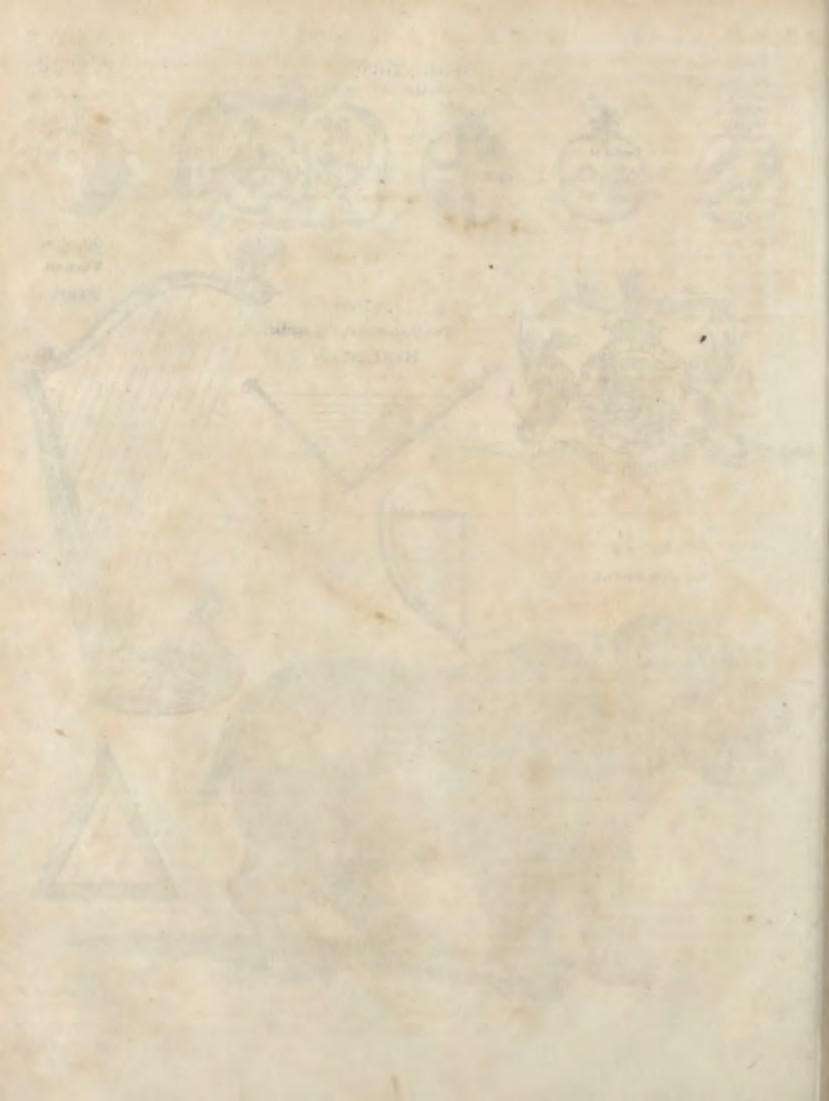
Fig. 26.
The Trigonum or Triangular.
HARP. N° 1.



Fig. 24.
HIPPOPOTAMI'S.



(A. Hall & Co.)



The Crest, — *A Laurel-tree couped, two branches sprouting out proper, and fixed to the lower part thereof with a Belt Gules, edged and buckled Or.* This, according to tradition in the family, was granted for some worthy action in the field.

2dly. The ancient and respectable badge of the most noble order of the Garter, instituted by king Edward III. 1349, in the 27th year of his reign; and which, ever since its institution, has been looked upon as a great honour bestowed on the noblest persons of this nation and other countries. This honourable augmentation is made to furround, as with a garter, the arms of such knights, and is inscribed with this motto, *Honi soit qui mal y pense*: See n° 7. which represents the coat-of-arms of his grace the duke of Montagu, earl of Cardigan, baron Brudenel of Stanton-Wivil, constable and lieutenant of Windforcastle, knight of the most noble order of the Garter, and baronet, president of St Luke's Hospital, and F. R. S.

This nobleman, whose arms were *Argent, a Chevron Gules between three Morions proper*, has, since the decease of John duke of Montagu, taken the name and arms of *Montagu*, on account of his being married to lady Mary Montagu, youngest daughter and one of the co-heiresses of his grace.

So far the causes for marshalling divers arms in one field, &c. are manifest. As to such as are called *obscure*, that is, when coats-of-arms are marshalled in such a manner, that no probable reason can be given why they are so conjoined, they must be left to heralds to explain, as being the properest persons to unfold these and other mysteries of this science.

C H A P. VII.

Of FUNERAL ESCUTCHEONS.

AFTER having treated of the essential parts of the coats-of-arms, of the various charges and ornaments usually borne therewith, of their attributes and dispositions, and of the rules for blazoning and marshalling them, we shall next describe the several funeral escutcheons, usually called *hatchments*; whereby may be known, after any person's decease, what rank either he or she held when living; and if it be a gentleman's hatchment, whether he was a bachelor, married man, or widower, with the like distinctions for gentlemen.

The hatchment, N° 1. represents such as are affixed to the fronts of houses, when any of the nobility and gentry dies; the arms therein being those of a private gentleman and his wife parted per pale; the dexter-side, which is *Gules*, three Bars *Or*, for the husband; having the ground without the escutcheon black, denotes the man to be dead; and the ground on the sinister-side being white, signifies that the wife is living, which is also demonstrated by the small hatchment, n° 2. which is here depicted without mantling, helmet, and crest, for perspicuity's sake only.

When a married gentlewoman dies first, the hatchment is distinguished by a contrary colour from the former; that is, the arms on the sinister-side have the ground without the escutcheon black; whereas those

on the dexter-side, for her surviving husband, are upon a white ground: the hatchment of a gentlewoman is, moreover, differentiated by a cherub over the arms instead of a crest. See n° 3.

When a bachelor dies, his arms may be depicted single or quartered, with a crest over them, but never impaled as the two first are, and all the ground without the escutcheon is also black. See n° 4.

When a maid dies, her arms, which are placed in a lozenge, may be single or quartered, as those of a bachelor; but, instead of a crest, have a cherub over them, and all the ground without the escutcheon is also black. See n° 5.

When a widower dies, his arms are represented impaled with those of his deceased wife, having a helmet, mantling, and crest over them, and all the ground without the escutcheon black. See n° 6.

When a widow dies, her arms are also represented impaled with those of her deceased husband, but inclosed in a lozenge, and instead of a crest, a cherub is placed over them; all the ground without the escutcheon is also black. See n° 7.

If a widower or bachelor should happen to be the last of his family, the hatchment is depicted as in n° 6.; and that of a maid or widow, whose family is extinct by her death, is depicted as in n° 7. with this difference only, that a death-head is generally annexed to each hatchment, to denote, that death has conquered all.

By the forementioned rules, which are sometimes neglected through the ignorance of illiterate people, may be known, upon the sight of any hatchment, what branch of the family is dead; and by the helmet or coronet, what title and degree the deceased person was of.

The same rules are observed with respect to the escutcheons placed on the hearse and horses used in pompous funerals, except that they are not surmounted with any crest, as in the foregoing examples of hatchments, but are always plain. It is necessary, however, to ensign those of peers with coronets, and that of a maiden lady with a knot of ribbands.

In *Scotland*, a funeral escutcheon not only shews forth the arms and condition of the defunct, but is also a proof of the gentility of his descent; and such persons for whom this species of escutcheon can be made out, are legally entitled to the character of gentlemen of blood, which is the highest species of gentility. The English hatchment above described exhibits no more than a right to a coat-of-arms which may be acquired by purchase, and is only the first step towards establishing gentility in a family.

The funeral escutcheon as exhibited in *Scotland*, *France*, and *Germany*, is in form of a lozenge, above six feet square, of black cloth; in the centre of which is painted, in proper colours, the complete achievement of the defunct, with all its exterior ornaments and additional marks or badges of honour; and round the sides are placed the sixteen arms of the families from which he derives his descent, as far back as the grandfather's grandfather, as the proofs of his gentility: they exhibit the armorial bearings of his father and mother, his two grandmothers, his four great-grandmothers, and his eight great-grandmothers; if all these families have acquired a legal right

to bear arms, then the gentility of the person whose proof it is must be accounted complete, but not otherwise. On the four corners are placed mort-heads, and the initials of his name and titles or designation; and the black interstices are fencible or powdered with tears, as in the figure, n^o 8. which is the escutcheon of the right hon. James 5th earl of Balcarras, chief of the ancient surname of *Lindsay*.

On the morning of the interment, one of these is placed on the front of the house where the deceased lies; and another on the church in which he is to be buried, which after the burial is fixed above the grave. The pall, too, is generally adorned with these proofs of gentility, and the horses of the hearse with the defunct's arms.

C H A P. VIII.

OF PRECEDENCY.

THE order of precedency, which is observed in general, is thus, That persons of every degree of honour or dignity take place according to the seniority of their creation, and not of years, unless they are descended from the blood-royal; in which case, they have place of all others of the same degree.

The younger sons of the preceding rank take place from the eldest son of the next mediate, viz. the younger sons of dukes from the eldest sons of earls; the younger sons of earls from the eldest sons of barons. All the chain of precedency is founded upon this gradation, and thus settled by act of parliament, 31 Henry VIII. cap. 10. anno 1539.

But there have been since some alterations made in this act by several decrees and establishments in the succeeding reigns, whereby all the sons of viscounts and barons are allowed to precede baronets. And the eldest sons and daughters of baronets have place given them before the eldest sons and daughters of any knights, of what degree or order soever, though superior to that of a baronet; these being but temporary dignities, whereas that of baronets is hereditary: and the younger sons of baronets are to have place next after the eldest sons of knights.

Observe also, that as there are some great officers of state, who take place, although they are not noblemen, above the nobility of higher degree; so there are some persons, who, for their dignities in the church, degrees in the universities, and inns of court, officers in the state, or army, although they are neither knights, nor gentlemen born, yet take place amongst them. Thus, all colonels and field officers who are honourable, as also the master of the ordnance, quarter-master general, doctors of divinity, law, physic, and music; deans, chancellors, prebendaries, heads of colleges in universities, and sergeants at law, are, by courtesy, allowed place before ordinary esquires. And all bachelors of divinity, law, physic, and music; masters of arts, barristers in the inns of courts; lieutenant-colonels, majors, captains, and other commissioned military officers; and divers patent officers in the king's household, may equal, if not precede, any gentleman that has none of these qualifications.

In towns corporate, the inhabitants of cities are preferred to those of boroughs; and those who have borne magistracy, to all others. And herein a younger

alderman takes not precedency from his senior by being knighted, or as being the elder knight, as was the case of Alderman Craven, who, though no knight, had place as senior alderman, before all the rest who were knights, at the coronation of king James. This is to be understood as to public meetings relating to the town; for it is doubted whether it will hold good in any neutral place. It has been also determined in the earl marshal's court of honour, that all who have been lord mayors of London, shall every where take place of all knights-bachelors, because they have been the king's lieutenants.

It is also quoted by Sir George Mackenzie, in his observations on precedency, that in the case of Sir John Crook, serjeant at law, it was adjudged by the judges in court, that such serjeants as were his seniors, though not knighted, should have preference notwithstanding his knighthood.—The precedency among men is as follows:

The KING, and Prince of WALES.

PRINCES OF THE BLOOD, viz. Sons, Grandsons, Brothers, Uncles, &c. of the king.

The following precede all Dukes by authority of the aforementioned Act of Parliament.

Archbishop of Canterbury.

Lord Chancellor, or Lord-Keeper.

Archbishop of York.

Lord Treasurer of England.

Lord President of the Privy-council.

Lord Privy-Seal.

These also precede all of their own Degree.

Lord Great-Chamberlain.

Lord High-Constable.

Lord Earl-Marshal.

Lord High-Admiral.

Lord Steward of the Household.

Lord Chamberlain of the Household.

Secretaries of State.

Then, according to their respective Creations,

Dukes.

Marquises.

Dukes eldest sons.

Earls.

Marquises eldest sons.

Dukes younger sons.

Viscounts.

Earls eldest sons.

Marquises younger sons.

Bishops.

Barons.

Speaker of the House of Commons.

Viscounts eldest sons.

Earls younger sons.

Barons eldest sons.

Knights of the Garter.

Privy-counsellors, who are styled Right Honourable.

Chancellor and Under-treasurer of the Exchequer.

Chancellor of the dutchy of Lancaster.

Lord Chief-justice of the King's bench.

Master of the Rolls.

Lord Chief-justice of the Common-pleas.

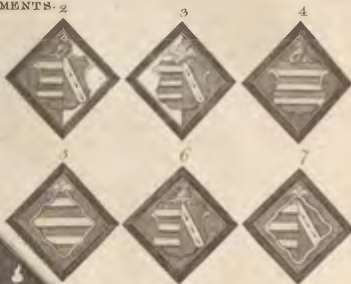
Lord Chief-baron of the Exchequer.

Justices and Barons in the Courts of Law.

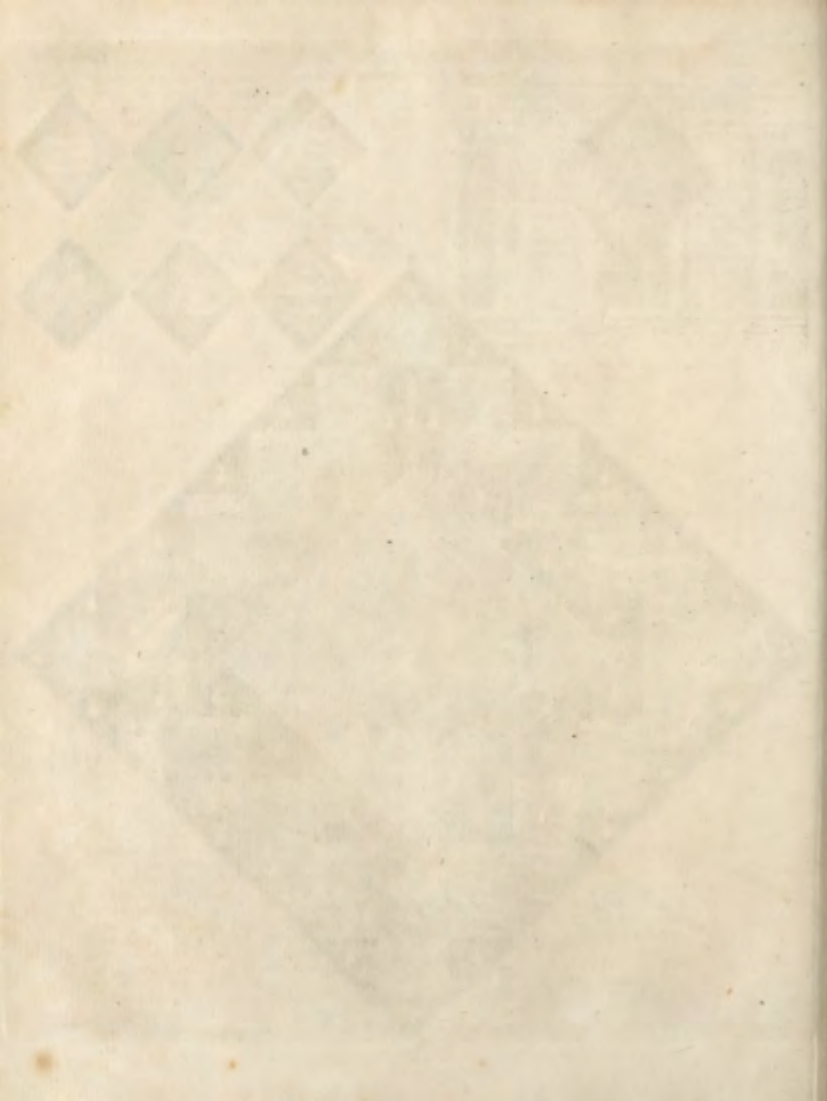
Viscounts younger sons.

Barons younger sons.

FUNERAL ATTACHEMENTS. 2



A Bell Sculp.



Baronets of England.
Baronets of Scotland.
Baronets of Ireland.
Knights of the Bath.
Field and Flag-officers.
Knights-bachelors.
Masters in Chancery.
Doctors, Deans, &c.
Serjeants at law.

Baronets eldest sons.
Knights of the Garter's eldest sons.
Knights of the Bath's eldest sons.
Knights-Bachelors' eldest sons.
Baronets younger sons.
Esquires by creation.
Esquires by office.
Gentlemen.
Citizens.
Burgesses, &c.

The esquires attending on knights of the Bath take place also from those gentlemen who are reputed esquires only during the time they are in office, and no longer; such as high sheriffs, justices of the peace, &c.

The precedence among men being known, that which is due to women, according to their several degrees, will be easily demonstrated: but it is to be observed, that women, before marriage, have precedence by their father; with this difference between them and the male children, that the same precedence is due to all the daughters that belongs to the eldest; which is not so among the sons; and the reason of this disparity seems to be, that daughters all succeed equally, whereas the eldest son excludes all the rest.

By marriage, a woman participates of her husband's dignities; but none of the wife's dignities can come by marriage to her husband, but are to descend to her next heir.

If a woman have precedence by creation, or birth, she retains the same though she marry a commoner: but if a woman nobly born marry any peer, she shall take place according to the degree of her husband only, though she be a duke's daughter.

A woman, privileged by marriage with one of noble degree, shall retain the privilege due to her by her husband, though he should be degraded by forfeiture, &c.; for crimes are personal.—Sir G. Mackenzie, *Of Precedency*, chap. ix.

The wife of the eldest son of any degree takes place of the daughters of the same degree, who always have place immediately after the wives of such eldest sons, and both of them take place of the younger sons of the preceding degree. Thus, the lady of the eldest son of an earl takes place of an earl's daughter, and both of them precede the wife of the younger son of a marquis; also the wife of any degree precedes the wife of the eldest son of the preceding degree. Thus, the wife

of a marquis precedes the wife of the eldest son of a duke.

This holds not only in comparing degrees, but also families of the same degree amongst themselves; for instance, the daughter of a senior earl yields place to the wife of a junior earl's eldest son: Though, if such daughter be an heiress, she will then be allowed place before the wives of the eldest sons of all younger earls. (W. Segar, *Of Honourable Places*, chap. xxii.) The precedence among women is as follows:

The QUEEN, and Princesses of WALES.
PRINCESSES, and DUCHESSES of the Blood.
DUCHESSES.

Wives of the eldest } of Dukes of the Blood.
sons; Daughters, }

MARCHIONESSES.

Wives of the eldest } of Dukes.
sons; Daughters, }

COUNTESSES.

Wives of the eldest } of Marquises.
sons; Daughters, }

Wives of the younger sons of Dukes.

VISCOUNTESSSES.

Wives of the eldest } of Earls.
sons; Daughters, }

Wives of the younger sons of Marquises.

BARONESSSES.

Wives of the eldest } of Viscounts.
sons; Daughters, }

Wives of the younger sons of Earls.

Wives of the eldest } of Barons.
sons; Daughters, }

Wives of the younger sons of Viscounts.

Wives of the younger sons of Barons.

WIVES OF BARONETS.

WIVES OF KNIGHTS of the Garter.

WIVES OF KNIGHTS of the Bath.

WIVES OF KNIGHTS Bachelors.

Wives of the eldest } of Baronets.
sons; Daughters, }

Wives of the eldest } of Knights of the Garter.
sons; Daughters, }

Wives of the eldest } of Knights of the Bath.
sons; Daughters, }

Wives of the eldest } of Knights-Bachelors.
sons; Daughters, }

Wives of the younger sons of Baronets.

WIVES OF ESQUIRES, by creation.

WIVES OF ESQUIRES, by office.

WIVES OF GENTLEMEN.

Daughters of Esquires.

Daughters of Gentlemen.

Wives of Citizens.

Wives of Burgesses, &c.

The Wives of Privy-counsellors, Judges, &c. are to take the same place as their husbands do. See the former list.

H E R

HERB, in botany; a name by which Linnæus denominates that portion of every vegetable which arises from the root, and is terminated by the fructification. It comprehends, 1. The trunk, stalk, or stem. 2. The leaves. 3. Those minute external parts called by

Vol. V.

H E R

the same author the *fulcrum*, or supports of plants. 4. The buds, or, as he also terms them, the *winter-quarters* of the future vegetable.

HERBACEOUS Plants, are those which have succulent stems or stalks that die down to the ground every year.

20 Q

OF

Herbage

Herbert

Of herbaceous plants, those are annual which perish stem and root and all every year; biennial, which subsist by the roots two years; perennal which are perpetuated by their roots for a series of years, a new stem being produced every spring.

HERBAGE, in law, signifies the pasture provided by nature for the food of cattle; also the liberty to feed cattle in the forest, or in another person's ground.

HERBAL, signifies a book that treats of the classes, genera, species, and virtues of plants.

HERBAL is sometimes also used for what is more usually called *hortus siccus*. See *HORTUS*.

HERBELOT (Bartholomew d'), a French writer, eminent for his oriental learning, was born at Paris in 1625. He travelled several times into Italy, where he obtained the esteem of some of the most learned men of the age. Ferdinand II. grand duke of Tuscany, gave him many marks of his favour: a library being exposed to sale at Florence, the duke desired him to examine the manuscripts in the oriental languages, to select the best of them, and to mark the price; which being done, that generous prince purchased them, and made him a present of them. M. Colbert being at length informed of Herbelot's merit, recalled him to Paris, and obtained a pension for him of one thousand five hundred livres: he afterwards became secretary and interpreter of the oriental languages, and royal professor of the Syriac tongue. He died at Paris in 1695. His principal work is intitled *Bibliothèque Orientale*, which he first wrote in Arabic, and afterwards translated into French. It is greatly esteemed. M. Herbelot's modesty was equal to his erudition; and his uncommon abilities were accompanied with the utmost probity, piety, and charity, which he practised through the whole course of his life.

HERBERT (Mary), countess of Pembroke, was sister of the famous Sir Philip Sidney, and wife of Henry earl of Pembroke. She was not only a lover of the muses, but a great encourager of polite literature; a character not very common among ladies. Her brother dedicated his incomparable romance *Arcadia* to her, from which circumstance it hath been called *The countess of Pembroke's Arcadia*. She translated a dramatic piece from the French, intitled *Antoni*, a tragedy; though it is said she was assisted by her lord's chaplain, Dr Babington, afterwards bishop of Exeter. She also turned the psalms of David into English metre; but it is doubtful whether these works were ever printed. She died in 1621; and an exalted character of her is to be found in Francis Osborne's memoirs of king James I.

HERBERT (Edward), lord Herbert of Cherbury in Shropshire, an eminent English writer, was born in 1581, and educated at Oxford; after which he travelled, and at his return was made knight of the Bath. James I. sent him ambassador to Lewis XIII. in behalf of the Protestants who were besieged in several cities of France; and continued in this station till he was recalled, on account of a dispute between him and the constable de Luines. In 1625 he was advanced to the dignity of a baron in the kingdom of Ireland, by the title of lord Herbert of Castle Island; and in 1631 to that of lord Herbert of Cherbury in Shropshire. After the breaking out of the civil wars, he adhered to the parliament; and, in 1644, obtained

a pension, on account of his having been plundered by the king's forces. He wrote a history of the life and reign of Henry VIII. which was greatly admired; a treatise de veritate; and several other works. He died at London in 1648.

"Lord Herbert," says Mr Granger, "stands in the first rank of the public ministers, historians, and philosophers, of his age. It is hard to say whether his person, his understanding, or his courage, was the most extraordinary; as the fair, the learned, and the brave, held him in equal admiration. But the same man was wise and capricious; redressed wrongs, and quarrelled for punctilios; hated bigotry in religion, and was himself a bigot to philosophy. He exposed himself to such dangers, as other men of courage would have carefully declined; and called in question the fundamentals of a religion which none had the hardihood to dispute besides himself."

HERBERT (George), an English poet and divine, was brother to the preceding. He was born in 1593, and educated at Cambridge. In 1619 he was chosen public orator of that university, and afterwards obtained a sinecure from the king. In 1626 he was collated to the prebend of Layton Ecclesia, in the diocese of Lincoln; and in 1630 was inducted into the rectory of Bamerton, near Sarum. The great lord Bacon had such an opinion of his judgment, that he would not suffer his works to be printed before they had passed his examination. He wrote a volume of devout poems called *The Temple*, and another intitled *The priest of the temple*. This pious divine died about the year 1635.

HERBERT (Sir Thomas), an eminent gentleman of the Pembroke family, was born at York, where his father was an alderman. William earl of Pembroke sent him to travel at his expence in 1626, and he spent four years in visiting Asia and Africa: his expectations of preferment ending with the death of the earl, he went abroad again, and travelled over several parts of Europe. In 1634, he published, in folio, *A relation of some years travel into Africa and the Great Asia, especially the territories of the Persian monarchy, and some parts of the oriental Indies, and isles adjacent*. On the breaking out of the civil war, he adhered to the parliament; and at Oldenby, on the removal of the king's servants, by desire of the commissioners from the parliament, he and James Harrington were retained as grooms of his bed-chamber, and attended him even to the block. At the restoration he was created a baronet by Charles II. for his faithful services to his father during his two last years. In 1678 he wrote *Threndia Carolina*, containing an account of the two last years of the life of Charles I. and he assisted Sir William Dogdale in compiling the third volume of his *Monasticon Anglicanum*. He died at York in 1682, leaving several MSS to the public library at Oxford, and others to that of the cathedral at York.

HERBIVOROUS ANIMALS, those which feed only on vegetables.

HERCULANEUM, a city of Naples, swallowed up by an earthquake in the reign of the emperor Titus, at the same time that there was an eruption of Mount Vesuvius: or rather it was overwhelmed with the ashes, sulphur, and other matter thrown out of that mountain, to the depth of eighty feet, and in some places of more than

Herbert

Herculanum.

than a hundred ; as appears from the whole earth thereabouts being made up of the matter which has been disgorged from the mountain, and all the houses which have appeared hitherto stand perfectly upright, which could not be the case if this disaster had happened from an earthquake. According to Strabo, one side of this ancient city was washed by the sea, and lay exposed to the south-west wind, which rendered it a very salutary and agreeable place to dwell in. There have been several attempts to open a passage to it : and about a hundred years since, a private gentleman found means to get out as much treasure, of one sort or other, as he sold for eighteen thousand pounds ; but one of his companions betraying him to the government, his effects were seized, and he was forced to fly into Germany. In 1738, this place was again examined, by order of the government : and some years ago they sunk a new passage into the higher part of the city, and when they were got to the level of the town, came to a broad and open square, partly natural, and partly made by the workmen ; and round this they have broken in to several fine apartments, and in one place into a whole street. In this square they found various antiquities, which shew the magnificence of the ancients. One room was lined with most beautiful purple and white marble, in regular pannels, each of which was edged with a black and gold-coloured marble, and surrounded with another of blue, green, white, and purple. The finest rooms were all covered with paintings, which are still extremely beautiful. In the niches there were statues, exquisitely carved ; particularly a Juno of a bluish white marble, the folding of whose robes, at a small distance, would be taken for real linen. The expression of the face is much beyond any thing of the kind that has been lately seen. Among the paintings there is a Prometheus chained to a rock, and a large bird feeding upon his liver ; and the whole is executed with so much beauty and majesty, that it exceeds all description. The figure is eight feet in length, and the muscles are expressed with surprizing art. The plumage of the bird seems to be loose and trembling, as in expectation of a feast ; and the fierceness of its eye is very remarkable. This indeed is a horrible portrait ; but that of Semele melting into transport at the sight of Jupiter, is all softness. There are a multitude of other figures, many of which are not understood. However, there is a representation of the public show of beasts, where some of the animals are painted in a surprizing manner ; as for instance, a dying tyger, the noblest performance of the kind ever executed. There is likewise the death of Achilles, in which the passions are well expressed, and a concealed joy in the face of Polixena that nothing can come up to. There have been likewise found a great many of the utensils and instruments formerly used among the Romans ; and many manuscripts, which are greatly decayed, and much art and care has been used to render them legible.—These manuscripts were thought to be the most valuable of all the curiosities which had been discovered ; and it was hoped that by their means some defects in ancient history might have been supplied ; but nothing of that kind hath been yet accomplished.

HERCULES, in fabulous history, a most renowned Grecian hero, said to have been born at Thebes

about the year 1280 B. C. He is reported to have been the son of Jupiter by Alcmena (wife to Amphitryon king of Argos), whom Jupiter enjoyed in the shape of her husband while he was absent ; and in order to add the greater strength to the child, made that amorous night as long as three. Amphitryon having soon after accidentally killed his uncle and father-in-law Electryon, was obliged to fly to Thebes, where Hercules was born. The jealousy of Juno, on account of her husband's amour with Alcmena, prompted her to destroy the infant. For this purpose she sent two serpents to kill him in the cradle, but young Hercules strangled them both. As he grew up, he discovered such extraordinary strength and fierceness, that he was sent to be brought up among some shepherds, where he killed a lion before he was eighteen years of age.

Euristheus, the son of Amphitryon, having succeeded his father, soon became jealous of Hercules ; and fearing lest he might by him be deprived of his crown, left no means untried to get rid of him. Of this Hercules was not insensible, because he was perpetually engaging him on some desperate expedition ; and therefore went to consult the oracle. But being answered that it was the pleasure of the gods that he should serve Euristheus 12 years, he fell into a deep melancholy, which at last ended in a furious madness ; during which, among other desperate actions, he put away his wife Megara, and murdered all the children he had by her. As an expiation of this crime, the king imposed upon him twelve labours surpassing the power of all other mortals to accomplish, which nevertheless our hero performed with great ease.

The first labour imposed upon him was the killing of a lion in Nemea, a wood of Achaia ; whose hide was proof against any weapon, so that he was forced to seize him by the throat and strangle him ; in memory of which he afterwards wore his skin about his shoulders.

In the second, he killed the Hydra ; a monster with two heads, one of which was no sooner cut off, than two sprung up in its room.

In the third, he brought the Erymanthian boar alive upon his shoulders ; at the sight of which the king is said to have been so frightened, that he ran and hid himself in a brazen hoghead. It was likewise in this expedition that he overcame the famous Centaurs.

In his fourth, he caught a hart with golden horns, and of prodigious swiftness.

In his fifth labour, he was commanded to cleanse Augeas's stable in one day, which he did by turning the river Alpheus into it. See AUGEAS.

In the sixth he chased away the mischievous birds of the lake Stymphe, who are feigned to have lived upon human flesh, and to have been at length destroyed by Hercules's arrows, or, according to others, to have been only scared away from thence.

His seventh was to fetch a famous bull from the isle of Crete, with which Pasiphaë the wife of Minos is said to have fallen in love. In this expedition, having helped Jupiter to overcome the Titanic giants, he reconciled Prometheus to him, and loosed him from mount Caucasus.

The eighth was to fetch the mares of Diomedes out of Thrace, which were tied with iron-chains to brass

Hercules.

zen mangers, and were fed with the flesh of the strangers that passed by that way. Hercules first threw their inhuman master to be devoured by them; and then brought the mares to Eurytheus, who dedicated them to Juno. Their breed is said to have continued till Alexander's time.

In the ninth he fetched away the girdle of the queen of the Amazons: and,

In the tenth, the oxen of Geryon out of Iberia, or Spain; in the furthest parts of which he erected his two pillars, as the utmost limits of the then known world. These ten labours he achieved, as the fable says, in about eight years. In this expedition he is likewise affirmed to have killed Antæus, a famous giant of a monstrous size, who, when weary with wrestling or labour, was immediately refreshed by touching the earth. Pliny makes him the founder of Tangier. Hercules overcame him in wrestling, and slew him; and after him the tyrant Busris in his way through Egypt. This bloody man used to sacrifice all his guests and strangers upon his altars; and designing to have done the same by Hercules, was slain by him, together with all his attendants.

His two last tasks were fetching Cerberus out of hell, and carrying away the Hesperian golden apples kept by a dragon; which last is interpreted to have been some fine herd of cattle kept by a strong man, and brought out of Africa to the king.

Many other exploits are said to have been performed by Hercules; the last of which was against Eurytus king Oechalia, who refused to give him Iôle his daughter, whom he had won by shooting against him and his sons. Upon this he slew him and his sons, and carried off his daughter with him. Coming soon after to the Cænean promontory in Eubœa, to offer some sacrifice there, he sent his servant Lychas to Trachin, to his wife Dejanira, for the shirt and coat in which he used to perform that ceremony.

This prince had some time before been attempted by the centaur Nessus, as he was ferrying her over the river Euenus; and Hercules beholding it from the shore, had given him a mortal wound with an arrow. The monster finding himself dying, advised her to mix some oil with the blood which flowed from his wound, and to anoint her husband's shirt with it, pretending that it would infallibly secure him from loving any other woman; and she, too well apprised of his inconfancy, had actually prepared the poisoned ointment accordingly.

Lychas coming to her for the garments, unfortunately acquainted her with his having brought away Iôle; upon which she, in a fit of jealousy, anointed his shirt with the fatal mixture. This had no sooner touched his body, than he felt the poison diffuse itself through all his veins; the violent pain of which caused him to disband his army, and to return to Trachin. His torment still increasing, he sent to consult the oracle for a cure; and was answered that he should cause himself to be conveyed to mount Oeta, and there rear up a great pile of wood, and leave the rest to Jupiter.

By the time he had obeyed the oracle, his pains being become intolerable, he dressed himself in his martial habit, flung himself upon the pile, and de-

red the by-standers to set fire to it; others say that he left the charge of it to his son Philoctetes, who having performed his father's command, had his bow and arrows given him as a reward for his obedience. At the same time Jupiter, to be as good as his word, sent a flash of lightning, which consumed both the pile and the hero; inasmuch that Iolæus, coming to take up his bones, found nothing but ashes; from which they concluded that he was passed from earth to heaven, and joined to the gods.

HERCULES, in astronomy. See there, n° 206.

HERCULES'S Pillars, in antiquity, a name given to mount Calpe in Spain, near Gibraltar; and mount Avila on the African side.

HERCYNIA SILVA, (anc. geog.) the largest of forests. Its breadth was a journey of nine days to the best traveller. Taking its rise at the limits of the Helvetii, Nemetes, and Raurici, it run along the Danube to the borders of the Daci and Anantes, a length of 60 days journey, according to Cæsar, who appears to have been well acquainted with its true breadth, seeing it occupied all Lower Germany. It may therefore be considered as covering the whole of Germany; and most of the other forests may be considered as parts of it, though distinguished by particular names: consequently the Hartz, in the duchy of Brunswick, which gave name to the whole, may be considered as one of its parts. The name Hartz denotes "resinous," or "pine-trees." By the Greeks it is called *Orcynius*, as a name common to all the forests in Germany; in the same manner as *Hercynius* was the name given by the Romans; and both from the German Hartz.

HERD, among hunters, an assemblage of black or fallow beasts, in contradistinction to flock. See Flock.—In the hunting language there are various terms used for companies of the divers kinds of game. We say a *herd* of harts or bucks, a *bevy* of roes, a *route* of wolves, a *richess* of martens, &c.

HEREDITAMENTS, whatever moveable things a person may have to himself and his heirs by way of inheritance; and which, if not otherwise bequeathed, descend to him who is next heir, and not to the executor as chattels do.

HEREDITARY, an appellation given to whatever belongs to a family by right of succession from heir to heir.

HEREDITARY is also figuratively applied to good or ill qualities supposed to be transmitted from father to son: thus we say virtue and piety are hereditary qualities in such a family; and that in Italy the hatred of families is hereditary. And indeed the gout, king's evil, madness, &c. may really be hereditary diseases.

HEREDITARY Right. The grand fundamental maxim upon which the *ius coronæ*, or right of succession to the throne of these kingdoms, depends, Sir William Blackstone takes to be this: "That the crown is, by common law and constitutional custom, hereditary; and this in a manner peculiar to itself: but that the right of inheritance may from time to time be changed or limited by act of parliament; under which limitations the crown still continues hereditary."

1. The crown is in general hereditary, or descendible to the next heir, on the death or demise of the last proprietor. All regal governments must be either hereditary

Hercules
Hereditary.

Hereditary. reditory or elective : and as there is no instance where-
in the crown of England has ever been asserted to be
elective, except by the regicides at the infamous and
unparalleled trial of king Charles I. it must of conse-
quence be hereditary. Yet in thus asserting an
hereditary right, a *jure divino* title to the throne
is by no means intended. Such a title may
be allowed to have subsisted under the theocratic
establishments of the children of Israel in Palestine :
but it never yet subsisted in any other country ; save
only so far as kingdoms, like other human fabrics, are
subject to the general and ordinary dispensations of
Providence. Nor indeed have a *jure divino* and an he-
reditary right any necessary connexion with each o-
ther ; as some have very weakly imagined. The titles
of David and Jeshu were equally *jure divino* as
those of either Solomon or Ahab ; and yet David
slew the sons of his predecessor, and Jeshu his pre-
decessor himself. And when our kings have the same
warrant as they had, whether it be to sit upon the
throne of their fathers, or to destroy the house of the
preceding sovereign, they will then, and not before,
possess the crown of England by a right like theirs,
immediately derived from heaven. The hereditary
right, which the laws of England acknowledge, owes
its origin to the founders of our constitution, and to
them only. It has no relation to, nor depends upon,
the civil laws of the Jews, the Greeks, the Romans,
or any other nation upon earth ; the municipal laws
of one society having no connexion with, or influence
upon, the fundamental polity of another. The found-
ers of our English monarchy might perhaps, if they
had thought proper, have made it an elective mo-
narchy ; but they rather chose, and upon good rea-
son, to establish originally a succession by inheritance.
This has been acquiesced in by general consent, and
ripened by degrees into common law ; the very same
title that every private man has to his own estate.
Lands are not naturally defensible, any more than
thrones : but the law has thought proper, for the be-
nefit and peace of the public, to establish hereditary
succession in the one as well as the other.

It must be owned, an elective monarchy seems to be
the most obvious, and best suited of any to the rational
principles of government, and the freedom of human
nature ; and accordingly we find from history, that, in
the infancy and first rudiments of almost every state,
the leader, chief magistrate, or prince, hath usually been
elective. And, if the individuals who compose that
state could always continue true to first principles, un-
influenced by passion or prejudice, unassailed by cor-
ruption, and unawed by violence, elective succession
were as much to be desired in a kingdom, as in other
inferior communities. The best, the wisest, and the
bravest man would then be sure of receiving that crown,
which his endowments have merited ; and the sense of
an unbiassed majority would be dutifully acquiesced in
by the few who were of different opinions. But history
and observation will inform us, that elections of every
kind (in the present state of human nature) are too fre-
quently brought about by influence, partiality, and ar-
tifice : and, even where the case is otherwise, these
practices will be often suspected, and as constantly charged
upon the successful, by a splenetic disappointed
minority. This is an evil to which all societies are

liable ; as well those of a private and domestic kind, as **Hereditary.**
the great community of the public, which regulates and
includes the rest. But in the former there is this ad-
vantage, That such suspicions, if false, proceed no far-
ther than jealousies and murmurs, which time will ef-
fectually suppress ; and, if true, the injustice may be
remedied by legal means, by an appeal to those tribu-
nals to which every member of society has (by be-
coming such) virtually engaged to submit. Whereas, in
the great and independent society, which every nation
composes, there is no superior to resort to but the law
of nature ; no method to redress the infringements of
that law, but the actual exertion of private force. As
therefore between two nations, complaining of mutual
injuries, the quarrel can only be decided by the law of
arms ; so in one and the same nation, when the funda-
mental principles of their common union are supposed
to be invaded, and more especially when the appoint-
ment of their chief magistrate is alleged to be unduly
made, the only tribunal to which the complainants can
appeal is that of the God of battles, the only process
by which the appeal can be carried on is that of a ci-
vil and intestine war. An hereditary succession to the
crown is therefore now established, in this and most o-
ther countries, in order to prevent that periodical blood-
shed and misery, which the history of ancient imperial
Rome, and the more modern experience of Poland and
Germany, may shew us are the consequences of elective
kingdoms.

2. But, secondly, as to the particular mode of in-
heritance, It in general corresponds with the feudal
path of descents, chalked out by the common law in
the succession to landed estates ; yet with one or two
material exceptions. Like them, the crown will de-
scend lineally to the issue of the reigning monarch ;
as it did from king John to Richard II. through a re-
gular pedigree of six lineal generations : As in them
the preference of males to females, and the right of
primogeniture among the males, are strictly adhered
to. Thus Edward V. succeeded to the crown, in pre-
ference to Richard his younger brother, and Elizabeth
his elder sister. Like them, on failure of the male
line, it descends to the issue female ; according to the
ancient British custom remarked by Tacitus, *Solent
feminarum ductu bellare, et sexum in imperiis non dis-
cernere*. Thus Mary I. succeeded to Edward VI. ;
and the line of Margaret queen of Scots, the daughter
of Henry VII. succeeded, on failure of the line of Hen-
ry VIII. his son. But among the females, the crown
descends by right of primogeniture to the eldest daugh-
ter only and her issue ; and not, as in common inheri-
tances, to all the daughters at once ; the evident ne-
cessity of a sole succession to the throne having occa-
sioned the royal law of descents to depart from the
common law in this respect : and therefore queen Ma-
ry, on the death of her brother, succeeded to the
crown alone, and not in partnership with her sister E-
lizabeth. Again, the doctrine of representation pre-
vails in the descent of the crown, as it does in other
inheritances ; whereby the lineal descendants of any
person deceased stand in the same place as their ances-
tor, if living, would have done. Thus Richard II.
succeeded his grandfather Edward III. in right of his
father the black prince ; to the exclusion of all his
uncles, his grandfather's younger children. Lastly,
on

on failure of lineal descendants, the crown goes to the next collateral relations of the late king; provided they are lineally descended from the blood-royal, that is, from that royal stock which originally acquired the crown. Thus Henry I. succeeded to William II. John to Richard I. and James I. to Elizabeth; being all derived from the Conqueror, who was then the only legal stock. But herein there is no objection (as in the case of common descents) to the succession of a brother, an uncle, or other collateral relation, of the *half-blood*; that is, where the relationship proceeds not from the same *couple* of ancestors, (which constitutes a kinsman of the *whole blood*), but from a *single* ancestor only; as when two persons are derived from the same father, and not from the same mother, or *vice versa*: provided only, that the one ancestor, from whom both are descended, be that from whose veins the blood-royal is communicated to each. Thus Mary I. inherited to Edward VI. and Elizabeth inherited to Mary; all born of the same father, king Henry VIII. but all by different mothers. See the articles CONSANGUINITY, DESCENT, and SUCCESSION.

3. The doctrine of hereditary right does by no means imply an *indefeasible* right to the throne. No man will assert this, who has considered our laws, constitution, and history, without prejudice, and with any degree of attention. It is unquestionably in the breast of the supreme legislative authority of this kingdom, the king and both houses of parliament, to defeat this hereditary right; and, by particular entails, limitations, and provisions, to exclude the immediate heir, and vest the inheritance in any one else. This is strictly consonant to our laws and constitution; as may be gathered from the expression so frequently used in our statute-book, of "the king's majesty, his heirs, and successors." In which we may observe, that as the word *heirs* necessarily implies an inheritance or hereditary right generally subsisting in the royal person; so the word *successors*, distinctly taken, must imply that this inheritance may sometimes be broken through; or, that there may be a successor, without being the heir of the king. And this is so extremely reasonable, that without such a power, lodged somewhere, our polity would be very defective. For, let us barely suppose so melancholy a case, as that the heir-apparent should be a lunatic, an idiot, or otherwise incapable of reigning; how miserable would the condition of the nation be, if he were also incapable of being set aside! — It is therefore necessary that this power should be lodged somewhere; and yet the inheritance and regal dignity would be very precarious indeed, if this power were *expressly* and *avowedly* lodged in the hands of the subject only, to be exerted whenever prejudice, caprice, or discontent, should happen to take the lead. Consequently it can nowhere be so properly lodged, as in the two houses of parliament, by and with the consent of the reigning king; who, it is not to be supposed, will agree to any thing improperly prejudicial to the rights of his own descendants. And therefore in the king, lords, and commons, in parliament assembled, our laws have expressly lodged it.

4. But, fourthly, However the crown may be limited or transferred, it still retains its defendable quality, and becomes hereditary in the wearer of it. And hence in our law the king is said never to die in his

political capacity; though, in common with other men, he is subject to mortality in his natural: because immediately upon the natural death of Henry, William, or Edward, the king survives in his successor. For the right of the crown vests, *eo instanti*, upon his heir; either the *heres natus*, if the course of descent remains unimpeached, or the *heres factus*, if the inheritance be under any particular settlement. So that there can be no *interregnum*; but, as Sir Matthew Hale observes, the right of sovereignty is fully invested in the successor by the very descent of the crown. And therefore, however acquired, it becomes in him absolutely hereditary, unless by the rules of the limitation it is otherwise ordered and determined: In the same manner as landed estates, to continue our former comparison, are by the law hereditary, or defendable to the heirs of the owner; but still there exists a power, by which the property of those lands may be transferred to another person. If this transfer be made simply and absolutely, the lands will be hereditary in the new owner, and descend to his heir at law: but if the transfer be clogged with any limitations, conditions, or entails, the lands must descend in that channel, so limited and prescribed, and no other. See SUCCESSION.

HEREDITAS JACENS, in Scots law. An estate is said to be in *hereditate jacente*, after the proprietor's death till the heir's entry.

HEREFORD, which in Saxon signifies the *ford of the army*, the capital of Herefordshire in England, situated in W. Lon. 2. 35. N. Lat. 52. 6. It is supposed to have risen out of the ruins of Kenchester, in its neighbourhood, which Camden believes to have been the *Ariconium* of Antoninus. It is very pleasantly situated among meadows and corn-fields, and is almost encompassed with rivers. It seems to have owed its rise, or at least its increase, to the building and dedicating a church there to Ethelbert king of the East-Angles, who was murdered in the neighbourhood and afterwards taken into the catalogue of martyrs; soon after it became a bishop's see, and in consequence of that a considerable place. In 1055 it was sacked, the cathedral destroyed, and its bishop Leofgar carried away captive by Gryffin prince of South-Wales, and Algar, an Englishman, who had rebelled against Edward the Confessor. Harold fortified it with a broad and high rampart; and it appears by Doomsday-book, that there were no more than 300 men within and without the wall. A very large and strong castle was built by the Normans along the Wye, and the city walled round. The present stately cathedral was founded in the reign of Henry I. by bishop Reinelm, but enlarged and beautified by his successors. It suffered much in the barons wars; and was often taken and retaken in the war between king Charles I. and the parliament. This city is pretty large, and had once six churches; but two were destroyed in the civil wars. It is not very populous nor well built, many of the houses being old. Its manufactures are gloves and other leathern goods; and its corporation consists of a mayor, six aldermen, a high-steward, deputy steward, and town-clerk, who have a sword-bearer, and four sergeants at mace. Each of the companies enjoys distinct laws and privileges by their charter, and each has its hall. The city gave
long

long the title of *earl* to the noble family of the Bohuns; then of *duke* to Henry of Lancaster, afterwards Henry IV. king of England; after him, of *earl* to Stafford, earl of Buckingham; then of *viscount* D'Evereux, earl of Essex, which a collateral branch of this family still enjoys, and is thereby the premier viscount of England.

HEREFORDSHIRE, a county of England, nearly of a circular form, bounded on the east by Worcester and Gloucester, on the south by Monmouthshire, on the west by Radnorshire and Brecknockshire, and on the north by Shropshire. Its length from north to south is 35 miles, its breadth from east to west 30; and its circumference 108. It contains 660,000 acres, 11 hundreds, one city, eight market-towns, 176 parishes, and 95,000 inhabitants. The members it sends to parliament are eight, namely, two for the county, two for Hereford city, two for Lempster, and two for Woolby.

The air of this county is allowed to be as pleasant, sweet, and wholesome, as that of any other in England, there being nothing either in the soil or situation to render it otherwise. The soil throughout is excellent, and inferior to none, either for grain, fruit, or pasture, supplying the inhabitants plentifully with all the necessities of life: but that by which it is distinguished from most others, is its fruit, especially apples, of which it produces such quantities, that the cyder made of them is not only sufficient for their own consumption, though it is their ordinary drink, but also in a great measure for that of London and other parts. That in particular which is made from the apple called *redstreak*, is much admired, and has a body almost equal to that of white-wine. The county is well supplied with wood and water; for, besides lesser streams, there are the rivers Frome, Loden, Lug, Wye, Wadel, Atrow, Dare, and Monow; the last of which is large, and all of them are well stored with fish, particularly the Wye, which breeds salmon. It lies in the diocese of Hereford, and Oxford circuit.

HERENHAUSEN, a palace of Germany near Hanover, belonging to the king of Great Britain. Here are lodgings for all the court; and a garden of vast extent, in which are fine waterworks, a labyrinth, and many other curiosities worthy the observation of a traveller.

HERENTHALS, a town of Brabant in the Austrian Netherlands, in the quarter of Antwerp; seated on the river Nethe, in E. Long. 4. 51. N. Lat. 51. 9.

HERESY, in law, an offence against Christianity, consisting in a denial of some of its essential doctrines, publicly and obstinately avowed; being defined, "*sententia rerum divinarum humano sensu exogitata; palam docta et pertinaciter defensa.*" And here it must also be acknowledged that particular modes of belief or unbelief, not tending to overturn Christianity itself, or to sap the foundations of morality, are by no means the object of coercion by the civil magistrate. What doctrines shall therefore be adjudged heresy, was left by our old constitution to the determination of the ecclesiastical judge; who had herein a most arbitrary latitude allowed him. For the general definition of an heretic given by Lyndewode, extends to the smallest deviations from the doctrines of holy church: "*hereticus est qui dubitat de fide catholica, et qui negligit*

servare ea, quæ Romana ecclesia statuit, seu servare decreverat." Or, as the statute 2 Hen. IV. c. 15. expresses it in English, "teachers of erroneous opinions, contrary to the faith and blessed determinations of the holy church." Very contrary this to the usage of the first general councils, which defined all heretical doctrines with the utmost precision and exactness. And what ought to have alleviated the punishment, the uncertainty of the crime, seems to have enhanced it in those days of blind zeal and pious cruelty. It is true, that the sanctimonious hypocrisy of the canonists went at first no farther than enjoining penance, excommunication, and ecclesiastical deprivation, for heresy; tho' afterwards they proceeded boldly to imprisonment by the ordinary, and confiscation of goods in *pious* use. But in the mean time they had prevailed upon the weakness of bigotted princes to make the civil power subservient to their purposes, by making heresy not only a temporal, but even a capital, offence: the Romish ecclesiastics determining, without appeal, whatever they pleased to be heresy, and shifting off to the secular arm the odium and drudgery of executions; with which they themselves were too tender and delicate to intermeddle. Nay, they pretended to intercede and pray, on behalf of the convicted heretic, *ut citra mortis periculum sententia circa eum moderetur*: well knowing that at the same time they were delivering the unhappy victim to certain death. Hence the capital punishments inflicted on the ancient Donatists and Manichæans by the emperors Theodosius and Justinian: hence also the constitution of the emperor Frederic mentioned by Lyndewode, adjudging all persons without distinction to be burnt with fire who were convicted of heresy by the ecclesiastical judge. The same emperor, in another constitution, ordained, that if any temporal lord, when admonished by the church, should neglect to clear his territories of heretics within a year, it should be lawful for good catholics to seize and occupy the lands, and utterly to exterminate the heretical possessors. And upon this foundation was built that arbitrary power, so long claimed and so fatally exerted by the Pope, of disposing even of the kingdoms of refractory princes to more dutiful sons of the church. The immediate event of this constitution was something singular, and may serve to illustrate at once the gratitude of the holy see, and the just punishment of the royal bigot; for, upon the authority of this very constitution, the pope afterwards expelled this very emperor Frederic from his kingdom of Sicily, and gave it to Charles of Anjou.

Christianity being thus deformed by the dæmon of persecution upon the continent, we cannot expect that our own island should be entirely free from the same scourge. And therefore we find among our ancient precedents a writ *de heretico comburendo*, which is thought by some to be as ancient as the common law itself. However, it appears from thence, that the conviction of heresy by the common law was not in any petty ecclesiastical court, but before the archbishop himself in a provincial synod; and that the delinquent was delivered over to the king to do as he should please with him: so that the crown had a controul over the spiritual power, and might pardon the convict by issuing no process against him: the writ *de heretico comburendo* being not a writ of course, but issuing only by the

Hereby.

the special direction of the king in council.

But in the reign of Henry IV. when the eyes of the Christian world began to open, and the seeds of the Protestant religion (though under the opprobrious name of *lollardy*) took root in this kingdom; the clergy, taking advantage from the king's dubious title to demand an increase of their own power, obtained an act of parliament, which sharpened the edge of persecution to its utmost keenness. For, by that statute, the diocesan alone, without the intervention of a synod, might convict of heretical tenets; and unless the convict alured his opinions, or if after abjuration he relapsed, the sheriff was bound *ex officio*, if required by the bishop, to commit the unhappy victim to the flames, without waiting for the consent of the crown. By the statute 2 Hen. V. c. 7. *lollardy* was also made a temporal offence, and indictable in the king's courts; which did not thereby gain an exclusive, but only a concurrent jurisdiction with the bishop's consistory.

Afterwards, when the final reformation of religion began to advance, the power of the ecclesiastical was somewhat moderated: for though what heresy *is*, was not then precisely defined, yet we are told in some points what it *is not*: the statute 25 Hen. VIII. c. 14. declaring, that offences against the see of Rome are not heresy; and the ordinary being thereby restrained from proceeding in any case upon mere suspicion; that is, unless the party be accused by two credible witnesses, or an indictment of heresy be first previously found in the king's courts of common law. And yet the spirit of persecution was not then abated, but only diverted into a lay channel. For in six years afterwards, by statute 31 Hen. VIII. c. 14. the bloody law of the six articles was made, which established the six most contested points of popery, transubstantiation, communion in one kind, the celibacy of the clergy, monastic vows, the sacrifice of the mass, and auricular confession; which points were "determined and resolved by the most godly study, pain, and travail of his majesty: for which his most humble and obedient subjects, the lords *spiritual* and temporal and the commons, in parliament assembled, did not only render and give unto his highness their most high and hearty thanks;" but did also enact and declare all opposers of the first to be heretics, and to be burnt with fire; and of the five last to be felons, and to suffer death. The same statute established a new and mixed jurisdiction of clergy and laity for the trial and conviction of heretics; the reigning prince being then equally intent on destroying the supremacy of the bishops of Rome, and establishing all other their corruptions of the Christian religion.

Without perplexing this detail with the various repeals and revivals of these sanguinary laws in the two succeeding reigns, let us proceed to the reign of queen Elizabeth; when the reformation was finally established with temper and decency, unsullied with party-rancour, or personal caprice and resentment. By statute 1 Eliz. c. 1. all former statutes relating to heresy are repealed, which leaves the jurisdiction of heresy as it stood at common law; *viz.* as to the infliction of common censures, in the ecclesiastical courts; and, in case of burning the heretic, in the provincial synod only. Sir Matthew Hale is indeed of a different opinion, and holds that such power resided in the diocesan also; tho' he agrees, that in either case the writ *de heretico com-*

burendo was not demandable of common right, but grantable or otherwise merely at the king's discretion. But the principal point now gained was, that by this statute a boundary is for the first time set to what shall be accounted heresy; nothing for the future being to be so determined, but only such tenets, which have been heretofore so declared, 1. By the words of the canonical scriptures; 2. By the first four general councils, or such others as have only used the words of the holy Scriptures; or, 3. Which shall hereafter be so declared by the parliament, with the assent of the clergy in convocation. Thus was heresy reduced to a greater certainty than before; though it might not have been the worse to have defined it in terms still more precise and particular: as a man continued still liable to be burnt, for what perhaps he did not understand to be heresy, till the ecclesiastical judge so interpreted the words of the canonical scriptures.

For the writ *de heretico comburendo* remained still in force; and we have instances of its being put in execution upon two Anabaptists in the seventeenth of Elizabeth, and two Arians in the ninth of James I. But it was totally abolished, and hereby again subjected only to ecclesiastical correction, *pro salute animæ*, by virtue of the statute 29 Car. II. c. 9: for, in one and the same reign, our lands were delivered from the slavery of military tenures; our bodies from arbitrary imprisonment by the *habeas corpus* act; and our minds from the tyranny of superstitious bigotry, by demolishing this last badge of persecution in the English law.

Every thing is now as it should be, with respect to the spiritual cognizance, and spiritual punishment, of heresy: unless perhaps that the crime ought to be more strictly defined, and no prosecution permitted, even in the ecclesiastical courts, till the tenets in question are by proper authority previously declared to be heretical. Under these restrictions, it seems necessary for the support of the national religion, that the officers of the church should have power to censure heretics; yet not to harass them with temporal penalties, much less to exterminate or destroy them. The legislature hath indeed thought it proper, that the civil magistrate should again interpose, with regard to one species of heresy, very prevalent in modern times; for by statute 9 & 10 W. III. c. 32. if any person educated in the Christian religion, or professing the same, shall by writing, printing, teaching, or advised speaking, deny any one of the persons in the holy Trinity to be God, or maintain that there are more Gods than one, he shall undergo the same penalties and incapacities which were just now mentioned to be inflicted on apostacy by the same statute.

HERETABLE RIGHTS, in Scots law, all rights affecting lands, houses, &c. or any immoveable subject.

HERETAGE, in Scots law, lands, houses, or any immoveable subject, in contradistinction to moveables or moveable subjects. It also sometimes signifies such immoveable property as a person succeeds to as heir to another, in contradistinction to that which he himself purchases or acquires in any other manner, called *conquest*.

HERETIC, a general name for all such persons under any religion, but especially the Christian, as profess or teach religious opinions contrary to the established

Herforden
||
Hermannia

blished faith, or to what is made the standard of orthodoxy. See HERESY.

HERFORDEN, or HERWARDEN, a free and imperial town of Germany, in the circle of Westphalia, and capital of the county of Ravensberg. Here is a famous nunnery belonging to the Protestants of the confession of Augsburg, whose abbess is a princess of the empire, and has a voice and place in the diet. It is seated on the river Aa. E. Long. 8. 47. N. Lat. 52. 12.

HERGUNDT, a town of Upper Hungary, remarkable for its rich mines of vitriol. Those who work in the mines have built a subterraneous town, which has a great number of inhabitants. E. Long. 18. 15. N. Lat. 48. 30.

HERISSON, in fortification, a beam armed with a great number of iron spikes with their points outwards, and supported by a pivot on which it turns. These serve as a barrier to block up any passage, and are frequently placed before the gates, and more especially the wicket-doors, of a town or fortress, to secure those passages which mult of necessity be often opened and shut.

HERMÆA, in antiquity, ancient Greek festivals in honour of the god Hermes or Mercury. One of these was celebrated by the Phenææ in Arcadia; a second by the Cyllenians in Elis; and a third by the Tanagræans, where Mercury was represented with a ram upon his shoulder, because he was said to have walked thro' the city in that posture in time of a plague, and to have cured the sick; in memory of which, it was customary at this festival for one of the most beautiful youths in the city to walk round the walls with a ram upon his shoulder.—A fourth festival of the same name was observed in Crete, when it was usual for the servants to sit down at the table while their masters waited; a custom which was also observed at the Roman Saturnalia.

HERMAN (Paul), a famous botanist in the 17th century, was born at Hall in Saxony. He practised physic in the Isle of Ceylon, and was afterwards made professor of botany at Leyden, where he died in 1695. He wrote a catalogue of the plants in the public garden at Leyden, and a work intitled *Flora Lugduno-Batava flores*.

HERMANN (James), a learned mathematician of the academy at Berlin, and a member of the academy of sciences at Paris, was born at Basil in 1678. He was a great traveller, and for six years was professor of mathematics at Padua. He afterwards went to Muscovy, being invited thither by the Czar in 1724. At his return to his native country, he was made professor of morality and natural law at Basil; and died there in 1733. He wrote several mathematical works.

HERMANNIA, in botany; a genus of the pentandria order, belonging to the monodelphia class of plants.

Species. 1. The lavenderifolia, hath a shrubby stalk and slender branches, very bushy, about a foot and an half high, small, spear-shaped, obtuse and hairy leaves, with clusters of small yellow flowers along the sides of the branches, continuing from June to Autumn. 2. The altheifolia hath a shrubby stalk, and soft woolly branches, growing two feet high, with numerous yellow flowers in loose spikes growing at the end of the branches, and making their appearance in July. 3. The

grossularifolia hath a shrubby stalk and spreading branches, growing three or four feet high, with bright yellow flowers coming out in great numbers at the ends of all the shoots and branches in April or May. 4. The alnifolia hath a shrubby stalk and branches growing irregularly four or five feet high, with pale yellow flowers in short spikes from the sides and ends of the branches, appearing in April or May. 3. The hyssopifolia hath a shrubby upright stalk, branching out laterally six or seven feet high, with pale yellow flowers in clusters from the sides of the branches, appearing in May and June.

Culture. All these plants are natives of Africa, and therefore must be kept in a green-house during the winter in this country. They are propagated by cuttings of their young shoots, which may be planted in pots of rich earth any time from April to July.

HERMANSTADT, a handsome, populous, and strong town of Hungary, capital of Transilvania, with a bishop's see. It is the residence of the governor of the province; and is seated on the river Ceben, in E. Long. 23. 40. N. Lat. 46. 25.

HERMANT (Godfrey), a learned doctor of the Sorbonne, born at Beauvais in 1917. He wrote many excellent works; the principal of which are, 1. The lives of St Athanasius, St Basil, St Gregory Nazianzen, St Chrysostom, and St Ambrose. 2. Four pieces in defence of the rights of the university of Paris against the Jesuits. 3. A French translation of St Chrysostom's treatise of Providence, and St Basil's Ascetics. 4. Extracts from the councils; published after his death, under the title of *Clavis discipline ecclesiastica*. He died suddenly at Paris in 1690.

HERMAPHRODITE, is generally understood to signify a human creature possessed of both sexes, or who has the parts of generation both of male and female. The term however is applied also to other animals, and even to plants.—The word is formed of the Greek ἑρμαφροδιτος, a compound of ἑρμης, Mercury, and ἀφροδιτη, Venus; q. d. a mixture of Mercury and Venus, i. e. of male and female. For it is to be observed, *Hermaphroditus* was originally a proper name, applied by the heathen mythologists to a fabulous deity, whom some represent as a son of *Hermes*, Mercury, and *Aphrodite*, Venus; and who, being desperately in love with the nymph *Salmacis*, obtained of the gods to have his body and hers united into one. Others say, that the god *Hermaphroditus* was conceived as a composition of Mercury and Venus, to exhibit the union between eloquence, or rather commerce, whereof Mercury was god, with pleasure, whereof Venus was the proper deity. Lastly, others think this junction intended to shew that Venus, (pleasure,) was of both sexes; as, in effect, the poet Calvus call Venus a god.

Pollentemque Deum Venerem.

As also Virgil, *Æneid*. lib. ii.

Dif. ed. ac ducente Deo flammam inter et hostes

Exspedior

M. Spon observes, *Hesychius* calls Venus *Aphroditos*; and *Theophrastus* affirms, that *Aphroditos*, or Venus, is *Hermaphroditus*; and that in the island of Cyprus she has a statue, which represents her with a beard like a man.—The Greeks also call *hermaphroditos* ἀνδρῶν, androgyni, q. d. men-women. See the article ANDROGYNES.

Herman-
stadt
||
Hermaphrodite.

The best treatise that hath appeared on this subject is that of Mr Hunter, in the 69th volume of the Philosophical Transactions. He divides hermaphrodites into *natural*, and *unnatural* or monstrous. The first belongs to the more simple orders of animals, of which there are a much greater number than of the more perfect. The *unnatural* takes place in every tribe of animals having distinct sexes, but is more common in some than in others. The human species, our author imagines, has the fewest; never having seen them in that species, nor in dogs; but in the horse, sheep, and black cattle, they are very frequent.

From Mr Hunter's account, however, it doth not appear that such a creature as a perfect hermaphrodite has ever existed. All the hermaphrodites which he had the opportunity of seeing had the appearance of females, and were generally saved as such. In the horse they are very frequent; and in the most perfect of this kind he ever saw, the testicles had come down out of the abdomen into the place where the udder should have been, and appeared like an udder, not so pendulous as the scrotum in the male of such animals. There were also two nipples, of which horses have no perfect form; being blended in them with the sheath or prepuce, of which there was none here. The external female parts were exactly similar to those of a perfect female; but instead of a common-sized clitoris, there was one about five or six inches long; which, when erect, stood almost directly backwards.

A foal as very similar to the above was killed, and the following appearances were observed on dissection. The testicles were not come down as in the former, possibly because the creature was too young. It had also two nipples; but there was no penis passing round the pubes to the belly, as in the perfect male ass. The external female parts were similar to those of the she-ass. Within the entrance of the vagina was placed the clitoris; but much longer than that of a true female, being about five inches long. The vagina was open a little further than the opening of the urethra into it, and then became obliterated; from thence, up to the fundus of the uterus, there was no canal. At the fundus of the common uterus it was hollow, or had a cavity in it, and then divided into two, viz. a right and a left, called the *horns* of the uterus, which were also pervious. Beyond the termination of the two horns were placed the ovaria, as in the true female; but the Fallopian tubes could not be found.—From the broad ligaments, to the edges of which the horns of the uterus and ovaria were attached, there passed towards each groin a part similar to the round ligaments in the female, which were continued into the rings of the abdominal muscles; but with this difference, that there were continued with them a process or theca of the peritonæum, similar to the tunica vaginalis communis in the male ass; and in these theca were found the testicles, but no vasa deferentia could be observed passing from them.

In most species of animals, the production of hermaphrodites appears to be the effect of chance; but in the black cattle it seems to be an established principle of their propagation. It is a well-known fact, and, as far as hath yet been discovered, appears to be universal, that when a cow brings forth two

calves, one of them a bull, and the other a cow to appearance, the cow is unfit for propagation, but the bull-calf becomes a very proper bull. They are known not to breed; they do not even shew the least inclination for the bull, nor does the bull ever take the least notice of them. Among the country people in England, this kind of calf is called a *free martin*; and this singularity is just as well known among the farmers as either cow or bull. When they are preferred, it is for the purposes of an ox or spayed heifer; viz. to yoke with the oxen, or fatten for the table. They are much larger than either the bull or the cow, and the horns grow longer and bigger, being very similar to those of an ox. The bellow of a free-martin is also similar to that of an ox, and the meat is similar to that of the ox or spayed heifer, viz. much finer in the fibre than either the bull or cow; and they are more susceptible of growing fat with good food. By some they are supposed to exceed the ox and heifer in delicacy of taste, and bear a higher price at market; this, however, does not always hold, and Mr Hunter gives an instance of the contrary. The Romans, who called the bull *taurus*, spoke also of *tauræ* in the feminine gender different from cows. Stephens observes, that it was thought they meant by this word *barren cows*, who obtained the name because they did not conceive any more than bulls. He also quotes a passage from Columella, lib. vi. cap. 22. "And, like the *tauræ*, which occupy the place of fertile cows, should be rejected or sent away." He likewise quotes Varro, *De re rustica*, lib. ii. cap. 5. "The cow which is barren is called *taura*." From which we may reasonably conjecture, that the Romans had not the idea of the circumstances of their production.

Of these creatures Mr Hunter dissected three, and the following appearances were observed in the most perfect of them.—The external parts were rather smaller than in the cow. The vagina passed on as in the cow to the opening of the urethra, and then it began to contract into a small canal, which passed on to the division of the uterus into the two horns; each horn passing along the edge of the broad ligament laterally towards the ovaria. At the termination of these horns were placed both the ovaria and testicles, both of which were nearly about the size of a small nutmeg. No Fallopian tubes could be found. To the testicles were vasa deferentia, but imperfect. The left one did not come near the testicle; the right only came close to it, but did not terminate in the body called *epididymis*. They were both pervious, and opened into the vagina near the opening of the urethra.—On the posterior surface of the bladder, or between the uterus and bladder, were the two bags called the *vesiculae seminales* in the male, but much smaller than what they are in the bull: the ducts opened along with the vasa deferentia.

Concerning hermaphrodites of the human species, much has been wrote, and many laws enacted about them in different nations; but the existence of them is still disputed. Dr Parsons has given us a treatise on the subject, in which he endeavours to explode the notion as a vulgar error. According to him, all the hermaphrodites that have appeared, were only women whose clitoris from some cause or other was overgrown;

Hermaphrodite
||
Hermes.

and, in particular, that this was the case with an Angola woman shewn at London as an hermaphrodite some time ago.

Among the reptile tribe, indeed, such as worms, snails, leeches, &c. hermaphrodites are very frequent.

HERMAPHRODITE Flowers, in botany. These are so called by the sexualists on account of their containing both the antheræ and stigma, the pretended organs of generation, within the same calix and petals. Of this kind are the flowers of all the classes in Linnæus's sexual method, except the classes *monœcia* and *diœcia*; in the former of which, male and female flowers are produced on the same root; in the latter, in distinct plants from the same fecd. — In the class *polygamia*, there are always hermaphrodite flowers mixed with male or female, or both, either on the same or distinct roots. In the plantain-tree the flowers are all hermaphrodite; in some, however, the antheræ or male organ, in others the stigma or female organ, proves abortive. The flowers in the former case are styled *female hermaphrodites*; in the latter, *male hermaphrodites*. — Hermaphrodites are thus as frequent in the vegetable kingdom as they are rare and scarce in the animal one.

HERMAS, an ecclesiastical author of the first century; and, according to Origen, Eusebius, and Jerome, the same whom St Paul salutes in the end of his epistle to the Romans. He wrote a book in Greek some time before Domitian's persecution, which happened in the year 95. This work is entitled *The Pastor*, from his representing an angel speaking to him in it under the form of a shepherd. The Greek text is lost, but a very ancient Latin version of it is still extant. Some of the fathers have considered this book as canonical. The best edition of it is that of 1698, where it is to be found among the other apostolical fathers, illustrated with the notes and corrections of Cotelærius and Le Clerc. With them it was translated into English by Archbishop Wake, the best edition of which is that of 1710.

HERMES, *Thoth*, or *Mercury*, one of the secondary gods of Egypt, who received divine honours on account of his useful and extraordinary talents.

There is no personage in all antiquity more renowned than the Egyptian Hermes, who was furnished *Trismegistus*, or *Thrice-illustrious*. He was the soul of Osiris's counsel and government; and is called by Sir Isaac Newton, his *secretary*. "Osiris," says he, "using the advice of his secretary Thoth, distributes Egypt into 36 nomes; and in every nome erects a temple, and appoints the several gods, festivals, and religions of the several nomes. The temples were the sepulchres of his great men, where they were to be buried and worshipped after death, each in his own temple, with ceremonies and festivals appointed by him; while he and his queen, by the names of *Osiris* and *Isis*, were to be worshipped in all Egypt: these were the temples seen and described by Lucian, who was himself an Egyptian, 1100 years after, and to be of one and the same age: this was the original of the several nomes of Egypt, and of the several gods and several religions of those nomes." And Diodorus Siculus tells us, that Mercury was honoured by Osiris, and afterwards worshipped by the Egyptians,

as a person endowed with extraordinary talents for every thing that was conducive to the good of society. He was the first who out of the coarse and rude dialects of his time formed a regular language, and gave appellatives to the most useful things: he likewise invented the first characters or letters, and even regulated the harmony of words and phrases: he instituted several rites and ceremonies relative to the worship of the gods, and communicated to mankind the first principles of astronomy. He afterwards suggested to them as amusements, wrestling and dancing; and invented the lyre, to which he gave three strings in allusion to the seasons of the year: for these three strings producing three different sounds, the grave, the mean, and the acute, the grave answered to winter, the mean to spring, and the acute to summer.

Among the various opinions of the several ancient writers who have mentioned this circumstance, and confined the invention to the Egyptian Mercury, that of Apollodorus is the most intelligible and probable. "The Nile, (says this writer), after having overflowed the whole country of Egypt, when it returned within its natural bounds, left on the shore a great number of dead animals of various kinds; and among the rest a tortoise, the flesh of which being dried and waisted by the sun, nothing was left within the shell but nerves and cartilages; and these being braced and contracted by desiccation, were rendered sonorous. Mercury, in walking along the banks of the Nile, happening to strike his foot against the shell of this tortoise, was so pleased with the sound it produced, that it suggested to him the first idea of a lyre, which he afterwards constructed in the form of a tortoise, and strung it with the dried sinews of dead animals." See *LYRE*.

It is generally imagined that there were two *Thoths* or *Mercuries* in Egypt, who lived at very remote periods, but both persons of great abilities. The Egyptians themselves distinguish two *Thoths* or *Hermes*; and yet the histories of the first and second are as much confounded together, as those of *Osiris* and *Sesostris*. *Div. Leg.* book iv. sect. 5.

The Greek Christians had so high an opinion of the antiquity of the first Egyptian Hermes, who lived at Sais, that they supposed him and the antediluvian patriarch Enoch to have been the same person, and give to both the same inventions. We are told likewise, that Manetho extracted his history and dynasties of the Egyptians from certain pillars in Egypt, on which inscriptions had been made by *Thoth* or the first *Mercury*, in the sacred letters before the flood! *Vid. Dodwell Dissert. de Sathon. Fabric. Bib. Gr. Stillingfleet. Orig. Sac. et alios.*

No less than 42 different works are attributed to the Egyptian Hermes by ancient writers; of these the learned and exact Fabricius has collected all the titles. It was usual for the Egyptians, who had the highest veneration for this personage, after his apotheosis, to have his works, which they regarded as their bible, carried about in processions with great pomp and ceremony; and the first that appeared in these solemnities was the chanter, who had two of them in his hands, while others bore symbols of the musical art. It was the business of the chanters to be particularly versed in the two first books of Mercury; one

Hermes.

Chronology,
p. 22.

Hermetical
||
Hermit.

of which contained the hymns to the gods; and the other, maxims of government: 36 of these books comprehended a complete system of Egyptian philosophy; the rest were chiefly upon the subjects of medicine and anatomy.

These books upon theology and medicine are ascribed by Marsham to the second Mercury, the son of Vulcan, who, according to Eusebius, lived a little after Moses; and this author, upon the authority of Manetho, cited by Syncellus, regarded the second Mercury as the Hermes furnished *Trismegistus*. Enough has been said, however, to prove, that the Egyptian Mercuries, both as to the time when they flourished, and their attributes, were widely different from the Grecian Mercury, the son of Jupiter and Maia. See MERCURY.

HERMETICAL PHILOSOPHY, that which undertakes to solve the various phenomena of nature, from the chemical principles salt, sulphur, and mercury.

HERMETICAL Seal, among chemists, a method of stopping glass-vessels used in chemical operations, so closely, that the most subtil spirit cannot escape thro' them.

It is commonly done by heating the neck of the vessel in a flame till ready to melt, and then twisting it closely together with a pair of pincers. Or vessels may be hermetically sealed by stopping them with a glass plug, or by putting one ovum philosophorum over another.

HERMIONE (anc. geog.), a considerable city of Argolis. It was in ruins, except a few temples, in the time of Pausanias; who says that the new city was at the distance of four stadia from the promontory on which the temple of Neptune stood. It gave name to the Sinus Hermionicus, a part of the Sinus Argolicus.

HERMIT, or EREMIT, *Eremita*, a devout person retired into solitude, to be more at leisure for prayer and contemplation, and to disencumber himself of the affairs of this world.—The word is formed from the Greek *ἐρημικός*, *desart*, or *wilderness*; and, according to the etymology, should rather be wrote *Eremit*.

Paul furnished the *hermit* is usually reckoned the first hermit; though St Jerome at the beginning of the life of that saint says, it is not known who was the first.—Some go back to John the Baptist, others to Elias: others make St Anthony the founder of the eremitical life; but others think that he only rekindled and heightened the fervour thereof, and hold that the disciples of that saint owned St Paul of Thebes for the first that practised it. The persecutions of Decius and Valerian are supposed to have been the occasion.—A hermit is not reputed a religious, unless he have made the vows.

HERMIT (Gaytier Peter the), a French officer of Amiens in Picardy, who quitted the military profession, and commenced hermit and pilgrim. Unfortunately, he travelled to the Holy Land about the year 1093; and making a melancholy recital of the deplorable situation of a few Christians in that country to Pope Urban II. and at the same time enthusiastically lamenting that Infidels should be in possession of the famous city where the Author of Christianity first promulgated his sacred doctrines, Urban gave him a fatal commis-

sion to excite all Christian princes to a general war against the Turks and Saracens the possessors of the Holy Land. See CRUSADES.

HERMOGENES, the first and most celebrated architect of antiquity, was, according to Vitruvius, born at Alabanda, a city in Caria. He built a temple of Diana at Magnesia; another of Bacchus at Tros; and was the inventor of several parts of architecture. He composed a book on the subject, which is lost.

HERMOGENES *Tarsensis*, a rhetorician and orator, and who was in every respect a prodigy. At 17 years of age he published his system of rhetoric, and at 20 his philosophic ideas: but at 25 he forgot every thing he had known. It is said, that his body being opened after his death, his heart was found of an extraordinary size, and all over hairy. He died about 168 B. C.

HERMON, or AERMON (anc. geog.); a mountain of the Amorites, called *Sanior* by the Phenicians, and *Sanir* or *Senir* by the Amorites on the east of Jordan. It is also called *Sion*, (Moses); but must not be confounded with the Sion of Jerusalem. By the Sidonians it was called *Scirion*; in the vulgate, it is called *Sarion*. Joshua informs us, that it was the dominion of Og king of Bashan; which must be understood of its south side. It is never particularly mentioned by profane writers; being comprised under the appellation *Libanus*, or *Antilibanus*, with which mountain it is joined to the east. It is also called *Hermontin* plurally, Psalm xlii. 6. because it was extensive, and contained several mountains.

HERMUS, (anc. geog.), a river of Ionia; which rising near Dorylæum, a town of Phrygia, in a mountain sacred to Dindymene or Cybele, touched Myſia, and ran through the Regio Combusta, then through the plains of Smyrna down to the sea, carrying along with it the Pactolus, Hyllus, and other less noble rivers. Its waters were said to roll down gold, by Virgil and other poets.

HERNANDRIA, JACK-IN-A-BOX TREE; a genus of the triandria order, belonging to the monœcia class of plants.

Species. 1. The sonora, or common jack-in-a-box, is a native of the West Indies. It grows 20 or 30 feet high; and is garnished with broad peltated leaves, and monœcious flowers, succeeded by a large swollen hollow fruit formed of the calix; having a hole or open at the end, and a hard nut within. The wind blowing into the cavity of this fruit makes a very whistling and rattling noise, whence comes the name. 2. The ovigera grows many feet high, garnished with large oval leaves not peltated; and monœcious flowers, succeeded by a swollen fruit open at the end, and a nut within.

Culture. Both these plants being tender exotics, must be planted in pots of rich earth, and always kept in a hot-house; in which, notwithstanding all the care that can be taken, they seldom flower, and never grow beyond the height of common shrubs, tho' in the places where they are natives they arrive at the height of trees. They are propagated by seeds procured from the West Indies.

HERNIA, in medicine. See (the *Index* subjoined to) MEDICINE, and SURGERY.

Her-
mo-
genes
||
Hernandria.

Herniaria
Herodians.

HERNIARIA, RUPTURE-WORT; a genus of the digynia order, belonging to the pentandria class of plants.

Species. There are four species, of which the only remarkable one is the glabra, or smooth rupture-wort, a native of many parts of England. It is a low trailing plant, with leaves like the smaller chickweed; the flowers come out in clusters from the side of the stalks at the joints, and are of a yellowish green colour.

Uses, &c. This plant is a little falsh and astringent. The juice takes away specks in the eye. Cows, sheep, and horses, eat the plant; goats and swine refuse it.

HERO, in Pagan mythology, a great and illustrious person, of a mortal nature, though supposed by the populace to partake of immortality, and after his death to be placed among the number of the gods. The word is formed of the Latin *heros*, and that of the Greek *ἥρως*, *seni-deus*, "demi-god."

HERO, in fabulous history, a famous priestess of Venus, lived at Abydos, in a tower situated on the banks of the Hellespont. She being beloved by Leander, who lived at Sestos on the other side of the strait, he every night swam over to visit her, being directed by a light fixed on the tower. But the light being put out in a stormy night, the youth missed his way, and was drowned; on which Hero threw herself into the sea, and perished.

HERO, the name of two celebrated Greek mathematicians; the one called the *old*, and the other the *young*, *Hero*. The younger was a disciple of Ctesibius. They are known by two works translated into Latin by Barochius: *Spiralium liber*, by Hero senior; and *Tractat. artis et machin. militar.* by Hero junior. They flourished about 130 and 100 B. C.

HEROD, falsely styled the *Great*, king and excrable tyrant of Judaea; who, on the strength of a misinterpreted prophecy, caused all the male children of Bethlehem and its neighbourhood, to be massacred by his soldiers at the time of the birth of Christ, in the vain hope of destroying the Saviour of mankind. He died, eaten with worms, two or three years after the birth of our Saviour, at the age of 71, after a reign of 40 years. He had ordered that all the persons of quality, whom he kept in prison, should be massacred the moment the breath was out of his body, in order that every considerable family in the kingdom might shed tears at his death; but that inhuman order was not executed.

HERODIAN, an eminent Greek historian, who spent the greatest part of his life at Rome, flourished in the third century, in the reigns of Severus, Caracalla, Heliogabalus, Alexander, and Maximin. His history begins from the death of Marcus Aurelius the philosopher; and ends with the death of Balbinus and Maximin, and the beginning of the reign of Gordian. It is wrote in very elegant Greek; and there is an excellent translation of it into Latin, by Angelus Politianus. Herodian has been published by Henry Stephens in 4to, in 1581; by Boecler, at Strasburg, in 1662, 8vo; and by Hudson, at Oxford, in 1699, 8vo.

HERODIANS, a sect among the Jews at the time of our Saviour; mentioned Math. xxii. 16. Mark iii. 6.

The critics and commentators are very much divided

with regard to the Herodians. St Jerom, in his Dialogue against the Luciferians, takes the name to have been given to such as owned Herod for the Messiah; and Tertullian and Epiphanius are of the same opinion. But the same Jerom, in his Comment on St Matthew, treats this opinion as ridiculous; and maintains, that the Pharisees gave this appellation by way of ridicule to Herod's soldiers who paid tribute to the Romans; agreeable to which the Syrian interpreters render the word by the *domestics of Herod*, i. e. "his courtiers." M. Simon, in his notes on the 22d chapter of Matthew, advances a more probable opinion. The name *Herodian* he imagines to have been given to such as adhered to Herod's party and interest; and were for preserving the government in his family, about which were great divisions among the Jews.—F. Hardouin will have the Herodians and Sadducees to have been the same.

HERODOTUS, an ancient Greek historian of Halicarnassus in Caria, son of Lyxus and Dryo, was born in the first year of the 74th Olympiad, that is, about 484 B. C. The city of Halicarnassus being at that time under the tyranny of Lygdamis grandson of Artemisia queen of Caria, Herodotus quitted his country and retired to Samos; from whence he travelled over Egypt, Greece, Italy, &c. and in his travels acquired the knowledge of the history and origin of many nations. He then began to digest the materials he had collected into order, and composed that history which has preserved his name among men ever since. He wrote it in the Isle of Samos, according to the general opinion.—Lucian informs us, that when Herodotus left Caria to go into Greece, he began to consider with himself,

What he should do to be for ever known
And make the age to come his own,

in the most expeditious way, and with as little trouble as possible. His history, he presumed, would easily procure him fame, and raise his name among the Grecians in whose favour it was written; but then he foresaw that it would be very tedious to go through the several cities of Greece, and recite it to each respective city; to the Athenians, Corinthians, Argives, Lacedaemonians, &c. He thought it most proper therefore to take the opportunity of their assembling all together; and accordingly recited his work at the Olympic games, which rendered him more famous than even those who had obtained the prizes. None were ignorant of his name, nor was there a single person in Greece who had not seen him at the Olympic games, or heard those speak of him who had seen him there.

His work is divided into nine books; which, according to the computation of Dionysius Halicarnassensis, contain the most remarkable occurrences within a period of 240 years; from the reign of Cyrus the first king of Persia, to that of Xerxes when the historian was living. These nine books are called after the names of the nine muses, each book being distinguished by the name of a muse; and this has given birth to two disquisitions among the learned: 1. Whether they were so called by Herodotus himself; and, 2. For what reason they were so called. As to the first, it is generally agreed that Herodotus did not impose these names himself; but it is not agreed why they were imposed:

Heroic,
Heron.

imposed by others. Lucian tells us, that these names were given them by the Grecians at the Olympic games, when they were first recited, as the best compliment that could be paid the man who had taken pains to do them so much honour. Others have thought that the names of the *muses* have been fixed upon them by way of reproach; and were designed to intimate, that Herodotus, instead of true history, had written a great deal of fable. But, be this as it will, it is certain, that, with regard to the truth of his history, he is accused by several authors; and, on the other hand, he has not wanted persons to defend him. Aldus Manutius, Joachim Camerarius, and Henry Stephens, have written apologies for him; and, among other things, have very justly observed, that he seldom relates any thing of doubtful credit without producing the authority on which his narration is founded; and, if he has no certain authority to fix it upon, uses always the terms *ut ferunt, ut ego audio, &c.*

There is ascribed also to Herodotus, but falsely, a *Life of Homer*, which is usually printed at the end of his work.—He wrote in the Ionic dialect, and his style and manner have ever been admired by all people of taste. There have been several editions of the works of this historian; two by Henry Stephens, one in 1570, and the other in 1592; one by Gale at London in 1679; and one by Gronovius at Leyden in 1715, which is the last and best, though not the best printed.

HEROIC POEM, that which describes some extraordinary enterprise; being the same with *EPIC* poem.

HEROIC Verse, that wherein heroic poems are usually composed, or it is that proper for such poems. In the Greek and Latin, hexameter verses are usually denominated heroic verses, as being those only used by *mer*, Virgil, &c. See **POETRY**, n^o 116—124.

HERON, in ornithology. See **ARDEA**.

This bird is a very great devourer of fish, and will do more mischief to a pond than even an otter. Some say that an heron will destroy more fish in a week than an otter will in three months; but that seems carrying the matter too far. People who have kept herons, have had the curiosity to number out the fish they fed them with into a tub of water; and counting them again afterwards, it has been found, that a heron will eat 50 moderate sized dace and roaches in a day. It has been found, that in carp-ponds visited by this bird, one heron will eat up 1000 fere carp in a year, and will hunt them so close that very few can escape. The readiest method of destroying this mischievous bird is by fishing for him in the manner of pike, with a baited hook. When the haunt of the heron is found out, three or four small roach or dace are to be procured, and each of them is to be baited on a wire with a strong hook at the end; entering the wire just under the gills, and letting it run just under the skin to the tail: the fish will live in this condition five or six days, which is a very essential thing; for if it is dead, the heron will not touch it. A strong line, about two yards long, is then to be prepared of silk and wire twisted together; tie this to the wire that holds the hook; and to the other end there is to be tied a stone of about a pound weight. Let three or four of these baits be sunk in different shallow parts of the pond, and in a night or two the heron will not fail of being taken by one or other of them.—When hawking was in use,

the heron afforded a great deal of sport to people who loved that diversion. There is but very little art in this flight of the hawk; but as both birds are large and courageous, the flight is finer than in the flight of smaller birds that make no resistance.

HERPES, in medicine, a bilious pustule, which breaking out in different manners upon the skin, accordingly receives different denominations. See (the *Index* subjoined to) **MEDICINE**.

HERRERA TORDESILLAS (Anthony), a Spanish historian, was secretary to Vespasian Gonzaga viceroy of Naples, and afterwards historiographer of the Indies, under king Philip II. who allowed him a considerable pension. He wrote a general history of the Indies, in Spanish, from 1492 to 1554; and of the world (not so much esteemed), from 1554 to 1598. He died in 1625, aged about 66.

HERRERA (Ferdinand de), an eminent Spanish poet, of the 16th century, was born at Seville, and principally succeeded in the lyric kind. Besides his poems, he wrote notes on Garcilasso de la Vega, and an account of the war of Cyprus and the battle of Lepanto, &c.

HERRING, in ichthyology. See **CLUPEA**.

HERRING (Thomas), archbishop of Canterbury, was the son of the rev. Mr John Herring, rector of Walsoken in Norfolk, where he was born in 1693. He was educated at Jesus-college, Cambridge; was afterwards chosen fellow of Corpus Christi college, and continued a tutor there upwards of seven years. Having entered into priest's orders in 1719, he was successively minister of Great Shelford, Stow cum Qui, and Trinity, in Cambridge; chaplain to Dr Fleetwood, bishop of Ely; rector of Rettingdon in Essex, and of Barly in Hertfordshire; preacher to the Society of Lincoln's Inn, chaplain in ordinary to his late majesty, rector of Blechingly in Surry, and dean of Rochester. In 1737 he was consecrated bishop of Bangor, and in 1743 translated to the archiepiscopal see of York. When the late rebellion broke out in Scotland, and the king's troops were defeated by the Highlanders at Prestonpans, he distinguished himself by removing the general panic, and awakening the nation from its lethargy. He convened the nobility, gentry, and clergy of his diocese; and addressed them in a noble speech, which had such an effect upon his auditory, that a subscription ensued, to the amount of forty thousand pounds; and the example was followed by the nation in general. On the death of Dr Potter in 1747, he was translated to the see of Canterbury; but in 1753, was seized with a violent fever, which brought him to the brink of the grave; and after languishing about four years, he died on the 13th of March 1757. He expended upwards of six thousand pounds in repairing and adorning the palaces of Croydon and Lambeth. This worthy prelate, in a most eminent degree, possessed the virtues of public life; his mind was filled with unaffected piety and benevolence, he was an excellent preacher, and a true friend to religious and civil liberty. After his death was published a volume of his sermons on public occasions.

HERSE, in fortification, a lattice, or portcullis, in form of an harrow, beset with iron-spikes. The word *herse* is French, and literally signifies "harrow;" being

Herpes
Heric.

Hefe
Hesbon.

being formed of the Latin *herpes* (or *irpex*), which denotes the same.

It is usually hung by a rope fastened to a moulinet; to be cut, in case of surprize, or when the first gate is broken with a petard, that the herfe may fall, and stop up the passage of the gate or other entrance of a fortrefs.

The herfe is otherwise called a *sarrafin*, or *catacraft*; and when it consists of straight stakes, without any cross-pieces, it is called *orgues*.

HERSE, is also a harrow, which the besieged, for want of chevaux de frise, lay in the way, or in breaches, with the points up, to incommode the march as well of the horse as of the infantry.

HERSILLON, in the military art, a fort of plank, or beam, ten or twelve feet long, whose two sides are drove full of spikes or nails, to incommode the march of the infantry or cavalry. The word is a diminutive of *herfe*; the hersillon doing the office of a little herfe. See HERSE.

HERTZBERG, a considerable town of Germany, in the electorate of Saxony, and on the confines of Lusatia. E. Lon. 13. 37. N. Lat. 51. 42.

HERVEY (James), a late divine of exemplary piety, was born in 1714, and succeeded his father in the livings of Weston Favell and Collingtree in Northamptonshire. These being within five miles of each other, he attended alternately with his curate; till being confined by his ill health, he resided constantly at Weston; where he diligently pursued the labours of the ministry and his study, under the disadvantage of a weak constitution. He was remarkably charitable; and desired to die just even with the world, and to be, as he termed it, his own executor. This excellent divine died on Christmas-day 1758, leaving the little he possessed to buy warm clothing for the poor in that severe season.—No work is more generally or deservedly known than his *Meditations and Contemplations*: containing, Meditations among the tombs, reflections on a flower-garden, a descent on creation, contemplations on the night and starry heavens, and a winter-piece. The sublime sentiments in these pieces have the peculiar advantage of being conveyed in a flowing elegant language, and they have accordingly gone through many editions. He published besides, *Remarks on Lord Bolingbroke's letters on history*; *Theron and Aspasio*, or a series of dialogues and letters on the most important subjects; some sermons, and other tracts.

HERVEY Island, one of the south-sea islands, discovered by captain Cook September 23d 1773, who gave it that name in honour of the earl of Bristol. It is a low island, situated in W. Lon. 158. 54. S. Lat. 19. 8.

HESBON, ESEBON, or *Hesbon*, (anc. geog.), the royal city of the Amorites, in the tribe of Reuben, according to Moses: Though in Joshua xxi. 39. where it is reckoned among the Levitical cities, it is put in the tribe of Gad; which argues its situation to be on the confines of both. It is thus determined by Jerome, who says, that in his time it was called *Ejbus*. A considerable city, in the mountains of Arabia, which lie over against Jericho, distant 20 miles from the Jordan; not indeed in the same latitude with Jericho, but somewhat more to the north, because situated on the

borders of the Gadites; and called a city of Arabia, because the Arabs were at that time possessed of the Lower Petraea.

HESIOD, a very ancient Greek poet; but whether cotemporary with Homer, or a little older or younger than him, is not yet agreed among the learned; nor is there light enough in antiquity to settle the matter exactly. His father, as he tells us in his *Opera et dies*, was an inhabitant of Cuma, one of the Eolian isles, now called *Taio Novas*; and removed from thence to Ascra, a little village of Boeotia, at the foot of mount Helicon, where Hesiod was probably born, and called, as he often is, *Ascreus*, from it. Of what quality his father was, is nowhere said; but that he was driven by his misfortunes from Cumæ to Ascra, Hesiod himself informs us. His father seems to have prospered better at Ascra than he did in his own country; yet Hesiod could arrive at no higher fortune than keeping sheep on the top of mount Helicon. Here the muses met with him, and entered him into their service:

Erewhile as they the shepherd-swain behold,
Feeding beneath the sacred mount his fold,
With love of charming song his breast they fir'd,
There me the heav'nly muses first inspir'd;
There, when the maids of Jove the silence broke.
To Hesiod thus, the shepherd-swain, they spoke, &c.

To this account, which is to be found in the beginning of his *Generatio Deorum*, Ovid alludes in these two lines:

Nec mihi sunt iuste Clío, Clisq; sorores.
Servant pœdæ vallibus Ascræ tuis.
Nor Clío nor her sisters have I seen,
As Hesiod saw them in th' Ascræan green.

On the death of the father, an estate was left, which ought to have been equally divided between the two brothers Hesiod and Peres; but Peres defrauded him in the division, by corrupting the judges. Hesiod was so far from resenting this injustice, that he expresses a concern for those mistaken mortals who place their happiness in riches only, even at the expence of their virtue. He lets us know, that he was not only above want, but capable of assisting his brother in time of need; which he often did, though he had been so ill used by him. The last circumstance he mentions relating to himself is his conquest in a poetical contention. Archidamus, king of Eubœa, had instituted funeral games in honour of his own memory, which his sons afterwards took care to have performed. Here Hesiod was a competitor for the prize in poetry; and won a tripod, which he consecrated to the muses.

Hesiod having entered himself in the service of the muses, left off the pastoral life, and applied himself to the study of arts and learning. When he was grown old, for it is agreed by all that he lived to a very great age, he removed to Locria, a town about the same distance from mount Parnassus as Ascra was from Helicon. His death was tragical. The man with whom he lived at Locris, a Milesian born, ravished a maid in the same house; and though Hesiod was entirely ignorant of the fact, yet being maliciously accused to her brothers as an accomplice, he was injuriously slain with the ravisher, and thrown into the sea.

The *Theogony*, and *Works and Days*, are the only undoubted.

Hesper
Hesperis.

undoubted pieces of this poet now extant : though it is supposed that these poems have not defended perfect and finished to the present time. A good edition of Hesiod's works was published by Mr Le Clerc at Amsterdam in 1701.

HESPER, an appellation given to the planet Venus when she sets after the sun. See HESPERUS.

HESPERIA, an ancient name of Italy ; so called by the Greeks from its western situation. *Hesperia* was also an appellation of Spain ; but with the epithet *ultima* (Horace), to distinguish it from Italy, which is called *Hesperia magna* (Virgil), from its extent of empire.

HESPERI CORNU, called the *Great Bay* by the author of Hanno's Periplus : but most interpreters, following Mela, understand a promontory ; some Cape Verd, others *Palmar Cape* : Vossius takes it to be the former, since Hanno did not proceed so far as the latter cape.

HESPERIDEÆ (from the *Hesperides*, whose orchards are said to have produced golden apples), *golden or precious fruit* : The name of the 19th order in Linnaeus's fragments of a natural method. See BOTANY, p. 1308.

HESPERIDES, in the ancient mythology, were the daughters of Hesper, or Hesperus, brother of Atlas. The Hesperides were three in number, *Ægle*, *Arethusa*, and *Hesperia*.—Hesiod, in his Theogony, makes them the daughters of Nox, night ; and seats them in the same place with the Gorgons, viz. at the extremities of the west, near mount Atlas : it is on that account he makes them the daughters of Night, by reason the sun sets there.

The Hesperides are represented by the ancients, as having the keeping of certain golden apples, on t'other side the ocean. The poets give them a dragon to watch the garden where the fruit grows : this dragon Hercules slew, and carried off the apples.

Pliny and Solinus will have the dragon to be no other than an arm of the sea, wherewith the garden was encompassed, and which defended the entrance thereof. And Varro supposes that the golden apples were nothing but sheep. Others, with more probability, say they were oranges.

HESPERIDUM INSULÆ, (anc. geog.), islands near the Hesperii Cornu ; but the accounts of them are so much involved in fable, that nothing certain can be affirmed of them.

HESPERIS, ROCKET, *Dame's violet*, or *queen's gilliflowers* ; a genus of the siliquosa order, belonging to the tetradynamia class of plants.

Species 1. The matronalis, or common sweet scented garden-rocket hath fibrous roots, crowned with a tuft of long, spear-shaped, rough leaves ; upright, single, hairy stalks two feet high ; garnished with oval, lanceolate, slightly indented, close-fitting leaves ; and the stalk and branches terminated by large and long spikes of sweet-scented flowers of different colours and properties in the varieties, of which there are a great number. All the varieties of this species are so remarkable for imparting a fragrant odour, that the ladies were fond of having them in their apartments. Hence they derived the name of *dame's violet* ; and, bearing some resemblance to a stock-gilliflower, were sometimes also called *queen's gilliflowers* ; but are now

most commonly called *rocket*. 2. The inedora, or scentless rocket, hath a fibrous root ; upright, round, firm stalks, two feet high, garnished with spear-shaped, acute-pointed, sharply indented, close-fitting leaves ; and all the branches terminated by large spikes of scentless flowers, with obtuse petals, of different colours and properties in the varieties. This species makes a fine appearance, but hath no scent. 3. The tristis, or dull-flowered night-smelling rocket, hath fibrous roots ; upright, branching, spreading, bristly stalks, two feet high ; spear-shaped pointed leaves ; and spikes of pale purple flowers, of great fragrance in the evening.

Culture. All the species are hardy, especially the first and second, which prosper in any of the open borders, and any common garden-soil ; but the third, being rather impatient of a severe frost, and of much moisture in winter, should have a dry warm situation, and a few may be placed in pots to be sheltered in case of inclement weather. They may be propagated either by seeds, by offsets, or by cuttings of the stalks.

HESPERUS, in fabulous history, son of Cephalus by Aurora, as fair as Venus, was changed into a star, called *Lucifer* in the morning, and *Hesperus* in the evening. See HESPER.

HESSE, a country of Germany, in the circle of the Upper Rhine ; bounded on the south by the bishopric of Fulda ; on the east, by the principality of Hersfeld, Thuringia, and Eichsfeld, as also by that of Calenberg ; on the north, by the bishopric of Paderborn, and Waldeck, the duchy of Westphalia, and the county of Witgenstein ; and on the west, by Nassau-Dillenburg, the county of Solms, and Upper-Isenburg. In the above limits, the county of Katzenelnbogen and some other territories are not included. The whole country, in its utmost length, is near 100 miles, and in some places near as much in breadth. The air is cold, but wholesome ; and the soil fruitful in corn, wine, wood, and pasture. The country abounds also in cattle, fish, and game ; salt-springs, baths, and mineral waters. The hills, which are many, yield silver, copper, lead, iron, alum, vitriol, pit-coal, sulphur, boles, a porcelain earth, marble, and alabaster. In the Eder, gold is sometimes found ; and at Frankenberg a gold mine was formerly wrought. Besides many lesser streams, Hesse is watered by the following rivers, viz. the Lahn, the Fulda, the Eder or Schwalm, the Werra or Weser, and Diemel. The Rhine also and the Mayne pass through the country of Katzenelnbogen. This country, like most others in Germany, has its states, consisting of the *prelates*, as they are called, the nobility, and the towns. The diets are divided into general and particular, and the latter into the greater and smaller committees. The house of Hesse is divided into two principal branches, viz. Cassel and Darmstadt, of which Philippsdale, Rhinfels, and Homburg, are collateral branches ; the two first of Hesse-Cassel, and the last of Hesse-Darmstadt. Their rights and privileges are very considerable. In particular, they have several votes at the diets of the empire ; and caufes, not exceeding 1000 florins, are determined by the courts of the country, without appeal. The princes of Hesse-Cassel are not of age till they are 25, but those of Hesse-Darmstadt are so at 18. The right of primogeniture hath been established in both

Hesperis.
Hesse.

Hesse
|
Heterogeneous.Heteroscii,
Hevelius.

both houses. The revenues of Darmstadt are said to amount to near 100,000*l.* a year, and those of Hesse-Cassel to near 200,000*l.* The small county of Schaumburg alone yields a revenue of 10,000*l.* and that of Katzenellenbogen, with the forests of Richardswalde, it is said, was farmed near 200 years ago at 12,000*l.* The prince of Hesse-Cassel has 40 or 50,000 men in his dominions fit to bear arms; and the troops that he hires out have often brought him in large sums, especially from Great Britain. The branches of Cassel, Homburg, and Philippsdale, are Calvinists; that of Darmstadt, Lutherans; and that of Rhinfeldts, Roman-catholics. The present prince of Hesse-Cassel, indeed, in the year 1749, embraced the Roman-catholic religion; but in 1754 drew up, and confirmed by oath, an instrument, of which all the Protestant princes are guaranties, declaring, that the established religion of his dominions should continue in every respect as before, and that his children should be brought up and instructed therein. Here, as in the other Protestant Lutheran countries of Germany, are consistories, superintendents, and inspectors of the church. In the whole landgraviate are three universities, besides Latin schools and gymnasia, for the education of youth. The manufactures of Hesse are linen cloth, hats, stockings, gloves, paper, goldsmiths wares, and at Cassel a beautiful porcelain is made. They have also the finest wool in Germany; but are reproached with want of industry, in exporting instead of manufacturing it themselves.—This is supposed to have been the country of the ancient Catti, mentioned by Tacitus, &c. who, in after-ages, were called *Chatti*, *Chassi*, *Hassi*, and *Hessi*. The two chief branches of Cassel and Darmstadt have many rights and privileges in common, which we have not room to specify. Both of them have a seat and vote in the college of princes at the diet of the empire, and those of this circle. Each of these princes, besides their guards and militia, maintains a considerable body both of horse and foot.

HESYCHIUS, the most celebrated of all the ancient Greek grammarians whose works are now extant, was a Christian; and, according to some, the same with Hefychius patriarch of Jerusalem, who died in 609. He wrote a Greek lexicon; which, in the opinion of Casaubon, is the most learned and useful work of that kind produced by the ancients. Schrevelius published a good edition of it in 1668, in 4to, with notes; but the best is that of John Alberti, printed at Leyden in 1746, in two vols folio.

HETEROCLITE, among grammarians, one of the three variations in irregular nouns, and defined by Mr Ruddiman, a noun that varies in its declension; as *hoc vas, vasis; hac vasa, vasorum*.

HETERODOX, in polemical theology, any thing contrary to the faith and doctrines of a church.

HETEROGENEITY, in physiology, that quality or property of bodies which denominates a thing heterogeneous.

HETEROGENEOUS, or **HETEROGENEAL**, something that consists of parts of dissimilar kinds, in opposition to *homogeneous*.

HETEROGENEOUS Light, is, by Sir Isaac Newton, said to be that which consists of rays of different degrees of refrangibility: thus the common light of the sun or clouds is heterogeneous, being a mixture of all

sorts of rays.

HETEROGENEOUS Nouns, one of the three variations in irregular nouns; or such as are of one gender in the singular number, and of another in the plural.—Heterogeneous, under which are comprehended mixed nouns, are six-fold. 1. Those which are of the masculine gender in the singular number, and neuter in the plural; as *hic tartarus, hec tartara*. 2. Those which are masculine in the singular number, but masculine and neuter in the plural; as *hic locus, hi loci, & hec loca*. 3. Such as are feminine in the singular number, but neuter in the plural; as *hec carbasis, & hec carbasa*. 4. Such nouns as are neuter in the singular number, but masculine in the plural; as *hec calum, hi cali*. 5. Such as are neuter in the singular, but neuter and masculine in the plural; as *hec rastrum, hi rastri, & hec rastra*; and, 6. Such as are neuter in the singular, but feminine in the plural number; as *hec epulum, he epule*.

HETEROSCII, in geography, a term of relation, denoting such inhabitants of the earth as have their shadows falling but one way, as those who live between the tropics and polar circles; whose shadows at noon in north latitude are always to the northward, and in south latitude to the southward.

HEVELIUS, or **HEVELKE**, (John), an eminent astronomer, was born at Dantzig in 1611. He studied in Germany, England, and France, and every where obtained the esteem of the learned. He was the first that discovered a kind of libration in the moon, and made several important observations on the other planets. He also discovered several fixed stars, which he named the *firmament of Sobieski*, in honour of John III. king of Poland. His wife was also well skilled in astronomy, and made a part of the observations published by her husband. In 1673, he published, A description of the instruments with which he made his observations, under the title of *Machina Cælestis*: and in 1679, he published the second part of this work; but in September the same year, while he was at a seat in the country, he had the misfortune to have his house at Dantzig burnt down. By this calamity he is said to have sustained a loss of several thousand pounds; having not only his observatory and all his valuable instruments and apparatus destroyed; but also a great number of copies of his *Machina Cælestis*; which accident has made this second part very scarce, and consequently very dear. In the year 1690 were published, “*Firmamentum Sobiescianum*,” and “*Prodromus astronomice & novæ tabulæ solares, una cum catalogo fixarum*,” in which he lays down the necessary preliminaries for taking an exact catalogue of the stars. But both these works are posthumous; for Hevelius died in 1687, on his birth-day, aged 76. He was a man greatly esteemed by his countrymen, not only on account of his great reputation and skill in astronomy, but as a very excellent and worthy magistrate. He was made a burgo-master of Dantzig; which office he is said to have executed with the utmost integrity and applause. He was also very highly esteemed by foreigners; and not only by those skilled in astronomy and the sciences, but by foreign princes and potentates: as appears abundantly from a collection of their letters which were printed at Dantzig in the year 1683.

Heurnius
Hexham.

HEURNIUS, or **VAN HEURN**, (John), a learned physician, was born at Utrecht, in 1543; and studied at Louvain, Paris, Padua, and Pavia. At his return to his native country he became magistrate of Amsterdam; after which he was professor of physic at Leyden, and rector of the university of that city, where he died in 1601. He wrote, among other works, several treatises on the diseases of different parts of the body, and several commentaries on the works of Hippocrates.—*Otho Heurnius*, his son, was also professor of physic at Leyden, and wrote some books.

HEUSDEN, a strong town of the United Provinces in Holland, seated on the river Maese among marshes, with a handsome castle, in E. Long. 5. 3. N. Lat. 51. 47.

HEWSON (William), a very ingenious anatomist, was born in 1739. He became assistant to Dr Hunter, and was afterwards in partnership with him; but, on their disagreement, read anatomical lectures at his own house (in which he was seconded by Mr Falconer). He wrote *Inquiries into the properties of the blood, and the lymphatic system*, 2 vols; and disputed with Dr Monro the discovery of the lymphatic system of vessels in oviparous animals. He died in 1774.

HEXACHORD, in ancient music, a concord called by the moderns a *sixth*.

HEXAGON, in geometry, a figure of six sides and angles; and if these sides and angles are equal, it is called a *regular hexagon*.

HEXAEDRON, in geometry, one of the five platonic bodies, or regular solids, being the same with a cube.

HEXAMETER, in ancient poetry, a kind of verse consisting of six feet; the first four of which may be indifferently either spondees or dactyls; the fifth is generally a dactyl, and the sixth always a spondee. Such is the following verse of Horace:

1 2 3 4 5 6
Aut prodeſſe volunt. aut deleſtare poeta.

HEXANDRIA, in botany, (from *ἕξ*, “six;” and *ἄντρον*, “a man;”) the name of the sixth class in Linnæus’s sexual method, consisting of plants with hermaphrodite flowers, which are furnished with six stamina or male organs, that are of an equal length. See *BOTANY*, p. 1292.

HEXASTYLE, in architecture, a building with six columns in front.

HEXHAM, a town of Northumberland. It is commonly reckoned to be the *Alexodunum* of the Romans, where the first cohort of the Spaniards were in garrison. It was made a bishop’s see by Etheldreda, wife of king of Egfred, in the year 675. Its first bishop, St Wilfred, built here a most magnificent cathedral and monastery, and it was possessed by seven bishops successively; but being very much infested by the Danes, the see was removed to York. The town is at present well built, and its market is pretty good for corn. There was a remarkable and bloody battle fought near this town, between the houses of Lancaster and York, wherein the former were defeated, chiefly by the extraordinary bravery and conduct of John Nevil, lord Montacute, who was for that reason created earl of Northumberland. W. Long. 1. 37. N. Lat. 55. 5.

HEYDON, a little, pleasant, well-built town of

Yorkshire, in that part called *Holderneſſe*, seated on a river that falls into the Humber. It has now but one church, tho’ there are the remains of two more; and had formerly a considerable trade, which is now lost, on account of its being far near Hull. The houses being rebuilt, adds to the beauty of the place. It is a corporation; and is governed by a mayor, a recorder, nine aldermen, and two bailiffs, who have the power of choosing sheriffs, and are justices of the peace. It sends two members to parliament. W. Long. 0. 55. N. Lat. 53. 46.

HEYDON (John), who sometimes assumed the name of *Eugenius Theodidactus*, was a great pretender to skill in the Rosicrucian philosophy and the celestial signs, in the reign of king Charles I.; and wrote a considerable number of chemical and astrological works, with very singular titles. This ridiculous author was much referred to by the duke of Buckingham, who was infatuated with judicial astrology. He employed him to calculate the king’s and his own nativity, and was assured that his stars had promised him great things. The duke also employed Heydon in some treasonable and seditious practices, for which he was sent to the tower. He lost much of his former reputation by telling Richard Cromwell and Thurloe, who went to him disguised like cavaliers, That Oliver would infallibly be hanged by a certain time; which he out-lived several years.

HEYLIN (Dr Peter), an eminent English writer, was born at Burford, in Oxfordshire, in 1600. He studied at Hart-hall, Oxford; where he took his degrees in arts and divinity, and became an able geographer and historian. He was appointed one of the chaplains in ordinary to king Charles I. was presented to the rectory of Hemingford in Huntingdonshire, made a prebendary of Westminster, and obtained several other livings: but of these he was deprived by the parliament, who also sequestered his estate; by which means he and his family were reduced to great necessity. However, upon the restoration, he was restored to his spiritualities; but never rose higher than to be subdean of Westminster. He died in 1662; and was interred in St Peter’s church in Westminster, where he had a neat monument erected to his memory. His writings are very numerous: the principal of which are, 1. *Microcosmus*, or a description of the great world. 2. *Cosmographia*. 3. The history of St George. 4. *Ecclesia vindicata*, or the church of England justified. 5. Historical and miscellaneous tracts, &c.

HEYWOOD (John), one of our most ancient dramatic poets, was born at North-Mims, near St Alban’s in Hertfordshire, and educated at Oxford. From thence he retired to the place of his nativity; where he had the good fortune to become acquainted with Sir Thomas More, who, it seems, had a seat in that neighbourhood. This patron of genius introduced our comic poet to the princeſs Mary, and afterwards to her father Henry, who, we are told, was much delighted with his wit, and skill in music, and by whom he was frequently rewarded. When his former patroness, queen Mary, came to the crown, Heywood became a favourite at court, and continued often to entertain her majesty, exercising his fancy before her, even to the time that she lay languishing on her death-bed.

Heydon
Heywood.

Heywood,
Hiatus.

bed. On the accession of Elizabeth, being a zealous Papist, he thought fit to decamp, with other favourites of her deceased majesty. He settled at Mechlin in Flanders, where he died in the year 1565.—John Heywood was a man of no great learning, nor were his poetical talents by any means extraordinary; but he possessed talents of more importance in the times in which he lived, namely, the talents of a jester. He wrote several plays; 500 epigrams; *A dialogue in verse concerning English proverbs*; and *The spider and fly, a parable*, a thick 4to. Before the title of this last work is a whole-length wooden print of the author; who is also represented at the head of every chapter in the book, of which there are 77.—He left two sons, who both became Jesuits and eminent men: viz. Ellis Heywood, who continued some time at Florence under the patronage of cardinal Pole, and became so good a master of the Italian tongue, as to write a treatise in that language, entitled *Il Moro*; he died at Louvain about the year 1572. His other son was Jasper Heywood, who was obliged to resign a fellowship at Oxford on account of his immorality: he translated three tragedies of Seneca, and wrote various poems and devices; some of which were printed in a volume, intitled, *The paradise of dainty devices*, 4to. 1573. He died at Naples in 1597.

HEYWOOD (Eliza), one of the most voluminous novel writers this island ever produced; of whom we know no more than that her father was a tradesman, and that she was born about the year 1696. In the early part of her life, her pen, whether to gratify her own disposition or the prevailing taste, dealt chiefly in licentious tales, and memoirs of personal scandal: the celebrated Atalantis of Mrs Manley served her for a model; and *The court of Carimania*, *The new Utopia*, with some other pieces of a like nature, were the copies her genius produced. She also attempted dramatic writing and performance, but did not succeed in either. Whatever it was that provoked the resentment of Pope, he gave full scope to it by distinguishing her as one of the prizes to be gained in the games introduced in honour of Dullness, in his Dunciad. Nevertheless, it seems undeniable, that there is much spirit, and much ingenuity, in her manner of treating subjects, which the friends of virtue may perhaps wish she had never meddled with at all. But, whatever offence she may have given to delicacy or morality in her early works, she appears to have been soon convinced of, and endeavoured to atone for in the latter part of her life; as no author then appeared a greater advocate for virtue. Among her riper productions may be specified, *The female Spectator*, 4 vols; *The history of Miss Betty Thoughtless*, 4 vols; *Jenny and Jenny Jessamy*, 3 vols; *The invisible spy*, 4 vols; with a pamphlet, intitled, *A present for a servant-maid*. She died in 1759.

HIATUS, properly signifies an opening, chasm, or gap; but it is particularly applied to those verses where one word ends with a vowel, and the following word begins with one, and thereby occasions the mouth to be more open, and the sound to be very harsh.

The term *hiatus* is also used in speaking of manuscripts, to denote their defects, of the parts that have been lost or effaced.

HIBISCUS, SYRIAN MALLOW; a genus of the po-

lyandria order, belonging to the monodelphia class of Hibiscus.

Species. Of this genus there are 25 species; the most remarkable are, 1. The Syriacus, commonly called *althæa frutex*, is a native of Syria. It rises with shrubby stalks to the height of eight or ten feet, sending out many woody branches covered with a smooth grey bark, garnished with oval spear-shaped leaves, whose upper parts are frequently divided into three lobes. The flowers come out from the wings of the stalk at every joint of the same year's shoot. They are large, and shaped like those of the mallow, having five large roundish petals which join at their base, spreading open at the top, in shape of an open bell. These appear in August; and if the season is not too warm, there will be a succession of flowers till September. The flowers are succeeded by short capsules, with five cells, filled with kidney-shaped seeds; but unless the season proves warm, they will not ripen in this country. Of this species there are four or five varieties, differing in the colour of their flowers: the most common hath pale purple flowers with dark bottoms; another hath bright purple flowers with black bottoms; a third hath white flowers with purple bottoms; and a fourth, variegated flowers with dark bottoms. There are also two with variegated leaves, which are by some much esteemed. All these varieties are very ornamental in a garden. 2. The Chinenfis is a native of the East Indies, whence it has got the name of *China rose*; but the seeds having been carried by the French to their West India settlements, it hath thence obtained the name of *Martinico rose*. Of this there are the double and single flowering kinds; the seeds of the first frequently produce plants that have only single flowers, but the latter seldom vary to the double kind. The plant has a soft spongy stem, which by age becomes ligneous and pithy. It rises to the height of 12 or 14 feet, sending out branches towards the top, which are hairy, garnished with heart-shaped leaves, cut into five acute angles on their borders, and slightly sawed on their edges; of a lucid green on their upper side, but pale below. The flowers are produced from the wings of the leaves; the single are composed of five petals which spread open, and are at first white, but afterwards change to a bluish rose colour, and as they decay turn purple. In the West Indies, all these alterations happen on the same day, and the flowers themselves are of no longer duration; but in Britain the changes are not so sudden. The flowers are surrounded by short, thick, blunt, capsules, which are very hairy; having five cells, which contain many small kidney-shaped seeds, having a fine plume of fibrous down adhering to them. 3. The almofcus, or musk, is a native of the West Indies, where the French cultivate great quantities of it. The plant rises with an herbaceous stalk three or four feet high, sending out two or three side-branches, garnished with large leaves cut into six or seven acute angles, sawed on their edges, having long footstalks, and placed alternately. The stalks and leaves of this sort are very hairy. The flowers come out from the wings of the leaves upon pretty long footstalks which stand erect. They are large, of a sulphur colour, with purple bottoms; and are succeeded by pyramidal five-cornered capsules, which open in five cells, filled with large kidney-shaped seeds of a

very musky odour. 4. The tiliaceus, or mahoe-tree, is a native of both the Indies. It rises with a woody, pithy stem, to the height of ten feet, dividing into several branches towards the top, which are covered with a woolly down, garnished with heart-shaped leaves ending in acute points. They are of a lucid green on their upper side, and hoary on the under side, full of large veins, and are placed alternately. The flowers are produced in loose spikes at the end of the branches, and are of a whitish-yellow colour. They are succeeded by short acuminate capsules, opening in five cells, filled with kidney-shaped seeds. 5. The javanica grows naturally on the coast of Malabar. It rises with a woody stalk 12 or 14 feet high, dividing into many small branches towards the top, garnished with oval sawed leaves ending in acute points, of a lucid green above, but pale on their under side, placed without order. The flowers come out from the sides of the branches at the wings of the leaves on pretty long foot-stalks. They are composed of many oblong roundish petals of a red colour, which expand like the rose; the flowers being as large when fully blown as the common red rose, and as double. 6. The gossypifolius, with a cotton leaf, is a native of the West Indies, and rises with an herbaceous stem three feet high, sending out several lateral branches, which are garnished with smooth leaves divided into five lobes. The flowers come out at the side of the branches. They are of a dirty white, with dark purple bottoms, and are succeeded by obtuse seed-vessels divided into five cells, which are filled with kidney-shaped seeds. 7. The trionum, Venice mallow, or flower of an hour, is a native of some parts of Italy, and has long been cultivated in the gardens of this country. It rises with a branching stalk a foot and an half high, having many short spines, which are soft, and do not appear unless closely viewed: the leaves are divided into three lobes, which are deeply jagged almost to the midrib. The flowers come out at the joints of the stalks, upon pretty long foot-stalks. They have a double empalement; the outer being composed of ten long narrow leaves, which join at their base: the inner is of one thin leaf swollen like a bladder, cut into five acute segments at the top, having many longitudinal purple ribs, and is hairy. Both these are permanent, and inclose the capsule after the flower is past. The flower is composed of five obtuse petals, which spread open at the top; the lower part forming an open bell-shaped flower. These have dark purple bottoms, but are of a pale sulphur-colour above. In hot weather the flowers continue but a few hours open; however, there is a succession of flowers that open daily for a considerable time. 8. The ficifolia, or ketmia of the Brasils, with a fig-leaf, is common in the West Indies. It rises with a soft herbaceous stalk from three to five feet high, dividing upward into many branches garnished with hand-shaped leaves, divided into five lobes. The flowers are produced from the wings of the stalks; they are of a pale sulphur-colour with dark purple bottoms, but are of a very short duration; opening in the morning with the rising sun, and fading long before noon in hot weather. They are succeeded by capsules of very different forms, in the different varieties. In some, the capsules are not thicker than a man's finger, and five or six inches long; in others, they are very thick, and not more than two

or three inches long; in some plants they grow erect, in others they are inclined, &c.

Culture. The first fort may be propagated either by seeds or cuttings. The seeds may be sown in pots filled with light earth about the latter end of March, and the young plants transplanted about the same time next year. They will succeed in the full ground; but must be covered in winter whilst young, otherwise they are apt to be destroyed. The second fort is propagated by seeds, which must be sown in a hot-bed. The young plants are to be transplanted into small separate pots, and treated like other tender vegetables, only allowing them a good share of air. The third fort is annual in this country, though biennial in those places where it is native. It is propagated by seeds, and must be treated in the manner directed for Amaranth. The fourth, fifth, sixth, and eighth forts require the same treatment with the third. The seventh is propagated by seeds, which should be sown where the plants are designed to remain, for they do not bear transplanting well. They require no other culture than to be kept free from weeds, and thinned where they are too close; and if the seeds are permitted to scatter, the plants will come up fully as well as if they had been sown.

Uses. The third fort is cultivated in the West Indies by the French, for the sake of its seeds. These are annually sent to France in great quantities, and form a considerable branch of trade, but the purposes which they answer are not certainly known. The flowers of the fifth kind are used by the Indian women of Malabar for colouring their hair and eyebrows of a black that will not wash off. The Europeans there use it for blacking their shoes, and thence have named it the *shoe-flower*. The green pods of the sixth fort have the taste of sorrel, and are used by the West Indians for giving an acid taste to their viands. The eighth fort is also cultivated by the West Indians for the sake of its pods. These they gather green to put into their soups; and having a soft viscous juice, they add a thickness to the soup which renders it very palatable.

HICETAS of Syracuse, an ancient philosopher and astronomer, who taught that the sun and stars were motionless, and that the earth moved round them. This is mentioned by Cicero, and probably gave the first hint of the true system to Copernicus. He flourished 344 B. C.

HICKES (George), an English divine of extraordinary parts and learning, born in 1642. In 1681 he was made king's chaplain, and two years after dean of Worcester. The death of Charles II. stopped his farther preferment; for, though his church principles were very high, he manifested too much zeal against Popery to be any favourite with James II. On the revolution, he with many others was deprived for refusing to take the oaths to king William and queen Mary; and soon after, archbishop Sancroft and his colleagues considering how to maintain episcopal succession among those who adhered to them, Dr Hickes carried over a list of the deprived clergy to king James; and with his sanction a private consecration was performed, at which it is said lord Clarendon was present. Among others, Dr Hickes was consecrated suffragan bishop of Thetford, and died in 1715.—He wrote, 1. *Institutiones Grammaticae Anglo-Saxonicae, et Maso-Gothicae.*

Hickup
||
Hicetacium.

thiæ. 2. *Antiqua literatura septentrionalis*. 3. Two treatises, one of the Christian priesthood, the other of the dignity of the episcopal order. 4. Jovian, or an answer to Julian the apostate. 5. Sermons; with many temporary controversial pieces on politics and religion.

HICKUP, or **HICCOUGH**, a spasmodic affection of the stomach, œsophagus, and muscles subservient to deglutition, arising sometimes from some particular injury done to the stomach, œsophagus, diaphragm, &c. and sometimes from a general affection of the nervous system. See (the *Index* subjoined to) **MEDICINE**.

HIDAGE (*Hidagium*), was an extraordinary tax payable to the kings of England for every hyde of land. This taxation was levied not only in money, but in provision, armour, &c.; and when the Danes landed in Sandwich in 994, king Ethelred taxed all his lands by hides; so that every 310 hides found one ship furnished, and every eight hides furnished one jack and one fiddle, to arm for the defence of the kingdom, &c.—Sometimes the word *hidage* was used for the being quit of that tax: which was also called *hidesgild*; and interpreted, from the Saxon, a “price, or ransom paid to save one’s skin or hide from beating.”

HIDE, the skin of beasts; but the word is particularly applied to those of large cattle, as bullocks, cows, horses, &c.

Hides are either raw or green, just as taken off the carcase, salted, or seasoned with salt, alum, and salt-petre, to prevent their spoiling; or curried and tanned. See **TANNING**.

HIDE of Land, was such a quantity of land as might be ploughed with one plough within the compass of a year, or as much as would maintain a family; some call it 60, some 80, and others 100 acres.

HIDE-Bound. See **FARRIERY**, §. xix.

HIERACIUM, **HAWKWEED**; a genus of the order of polygamia æqualis, belonging to the syngenesia class of plants.

Species. 1. The aurantiacum, commonly called *grim the collier*, hath many oblong oval entire leaves, crowning the root; an upright, single, hairy, and almost leafless stalk, a foot high, terminated by reddish orange-coloured flowers in a corymbus. These flowers have dark oval ash-coloured calyces; whence the name of *grim the collier*. 2. The pilosella or moufe-ear, hath blossoms red on the outside, and pale yellow within; the cups set thick with black hairs. The flowers open at eight in the morning, and close about two in the afternoon. 3. The umbellatum grows to the height of three feet, with an erect and firm stalk, terminated with an umbel of yellow flowers.

Culture. The first is the only species cultivated in gardens. It is propagated by seeds, or parting the roots. The feed may be sown in autumn or spring. In June, when the plants are grown two or three inches high, they may be picked out and planted in beds, where they must remain till the next autumn, and then transplanted where they are to remain.

Properties. The second species is common in dry pastures in England; it has a milky juice, but is less bitter and astringent than is usual with plants of that class. It is reckoned hurtful to sheep. An insect of the cochineal genus, (*Coccus Polonicus*) is often found at the roots, (*Ad. Upfal. 1752*). Goats eat it; sheep are not fond of it; horses and swine refuse it.—

The third species is a native of Scotland, and grows in rough stony places, but is not very common. The flowers are sometimes used for dying yarn of a fine yellow colour.

HIERACITES, in church-history, Christian heretics in the third century: so called from their leader Hierax, a philosopher of Egypt; who taught that Melchisedek was the Holy Ghost, denied the resurrection, and condemned marriage.

HIERANOSIS, or **MORBUS SACER**. See (the *Index* subjoined to) **MEDICINE**.

HIERA PICRA. See **PHARMACY**, n° 826.

HIERARCHY, among divines, denotes the subordination of angels.

Some of the rabbins reckon four, others ten, orders or ranks of angels; and give them different names according to their different degrees of power and knowledge.

HIERARCHY, likewise denotes the subordination of the clergy, ecclesiastical polity, or the constitution and government of the Christian church considered as a society.

HIERES, the name of some small islands lying near the coast of Provence in France, opposite to the towns of Hieres and Toulon, where the English fleet lay many months in 1744, and blocked up the French and Spanish fleets in the harbour of Toulon.

HIERES, a town of Provence in France, seated on the Mediterranean sea. It is a pretty little town, and was formerly a colony of the Maritians; and pilgrims used to embark here for the holy land.

But its harbour being now choaked up, it is considerable only for its salt-works. E. Long. 6. 13. N. Lat. 43. 7.

HIERO I. and **II.** kings of Syracuse. See **SYRACUSE**.

HIEROCLES, a cruel persecutor of the Christians, and a violent promoter of the persecution under Dioclesian, flourished in 302. He wrote some books against the Christian religion; in which he pretends some inconsistencies in the Holy Scriptures, and compares the miracles of Apollonius Tyaneus to those of our Saviour. He was refuted by Lactantius and Eusebius. The remains of his works were collected into one volume octavo, by bishop Pearson; and published in 1654, with a learned dissertation prefixed to the work.

HIEROCLES, a Platonic philosopher of the fifth century, taught at Alexandria, and was admired for his eloquence. He wrote seven books upon Providence and Fate; and dedicated them to the philosopher Olympiodorus, who by his embassies did the Romans great services under the emperors Honorius and Theodosius the younger. But these books are lost, and we only know them by the extracts in Photius. He wrote also a Commentary upon the golden verses of Pythagoras; which is still extant, and has been several times published with those verses.

HIEROGLYPHICS, in antiquity, mystical characters, or symbols, in use among the Egyptians, and that as well in their writings as inscriptions; being the figures of various animals, the parts of human bodies, and mechanical instruments.

The word is composed of the Greek ἱερός, *sacer*, “holy,” and γλυφειν, *sculpsere*, “to engrave;” it being the custom to have the walls, doors, &c. of their temples, obelisks, &c. engraven with such figures.

After

Hieracites
||
Hieroglyphics.

After Hermes, and the Egyptian priests who succeeded, had, by long study and speculation, formed a system of theology, and natural philosophy, in which God, the supreme cause of all, was the universal soul diffused through the whole creation, they endeavoured to express the divine attributes and operations of the Deity, in the works of nature, by the properties and powers of living animals, and other natural productions, as the proper symbols of such amazing causes.

In order to choose the most proper symbols, and, at the same time, the most expressive of the divine attributes, and of the effects of Divine Providence in every part of the universe, they studied with great application and care, not only the peculiar properties of those animals, birds, and fishes, herbs and plants, which Egypt produced; but also the geometrical properties of lines and figures; and by a regular connection of these in various orders, attitudes, and compositions, they formed the whole system of their theology and philosophy, which was hidden under hieroglyphic figures and characters, known only to themselves, and to those who were initiated into their mysteries.

In this system their principal hero-gods, Osiris and Isis, theologically represented the Supreme Being, and universal nature; and physically signified the two great celestial luminaries, the sun and moon, by whose influence all nature was actuated. In like manner, the inferior heroes represented the subordinate gods, who were the ministers of the supreme spirit; and physically they denoted the inferior mundane elements and powers. Their symbols represented, and comprehended under them, the natural productions of the Deity; and the various beneficial effects of Divine Providence, in the works of creation: and also the order and harmony, the powers and mutual influence of the several parts of the universal system.

This is the sum and substance of the Egyptian learning, so famed in ancient times throughout the world. And in this general system, the particular history of their hero-gods was contained, and applied to physical causes, and theological science. The hieroglyphic system was composed with great art and sagacity; and was so universally esteemed and admired, that the most learned philosophers of other nations came into Egypt on purpose to be instructed in it, and to learn the philosophy and theology conveyed by these apostolic symbols.

In this hieroglyphic system the hero-gods not only represented, and were symbols of, the supreme God, and subordinate deities; but they had each their animal symbol, to represent their peculiar powers, energy, and administration: and their figures were compounded of one part or other of their symbols, to express more sensibly the natural effects of divine energy attributed to them.

Thus Osiris, when he represented the power and all-seeing providence of the Supreme Being, had a human body with a hawk's head, and a sceptre in his hand, and decorated with the other regalia or ensigns of royalty. Under the same form also he represented the sun, the great celestial luminary; and, as it were, the soul of the world: his symbol now was a bull, and the scarabæus or beetle, which expressed the sun's

motion, by rolling balls of dung, containing its seed, backwards, or from east to west, his face being towards the east. The symbolic bull was likewise of a particular form and make, to denote the various influences of the sun.

Osiris was also delineated sometimes with a bull's, and sometimes with a lion's head, to represent the heat, vigour, and influence of the sun, especially in the inundation of the Nile, when the sun was in the celestial sign Leo; and likewise to express the solar influence in all the productions of nature. And it is also observable, that the bull and lion were parts of the Jewish cherub's symbol; and as the one was the head of the wild, and the other of the tame beasts, they represented, in conjunction, the animal-creation; while the other two parts, namely, the eagle and human figure, represented the aerial, rational creation.

Isis was formed with many beasts, to represent the earth, the universal mother; and with a cornucopia in her hand, denoting the nutritive and productive powers of nature: her symbol was a cow, part black and part white, to represent the enlightened and dark parts of the moon.

Pan had the horns and feet, and sometimes also the head, of a goat, which was his symbol, to shew the generative power of nature, over which he presided. At the same time, he symbolically represented universal nature, the cause of all things.

Hermes had a dog's head, which was his symbol, to denote his sagacity in the invention of arts and sciences; especially in his watchful diligence in the culture of religious rites and sacred knowledge: at the same time he symbolically represented the Divine Providence, and was worshipped as the chief counsellor of Saturn and Osiris; he who communicated the will of the gods to men, and by whom their souls were conducted into the other world. He was likewise represented by the ibis, and with the head of this bird, which was at the same time his symbol, to signify his conveying literature to the Egyptians; which they believed was done under the form of this bird, and confined to their nation only, as the ibis was known to live no where but in Egypt.

Ammon represented the deity called *Amun*, and his symbol was a ram. He was also delineated with a ram's head and horns, to denote the creative power of God, and his beneficial and diffusive influence through the works of nature, making every thing fruitful, to produce and multiply its kind; and cherishing and preserving them by the warmth of the sun, and an internal vital heat and vigour.

The universal soul itself was beautifully represented by a winged globe, with a serpent emerging from it. The globe denoted the infinite divine essence, whose centre, to use the expression in the Hermetic writings, was every where, and circumference no where. The wings of the hawk represented the divine all-comprehensive intellect: and the serpent denoted the vivifying power of God, by which life and existence are given to all things.

Typhon represented the most powerful dæmon, or evil genius; who was continually at war with Osiris and Isis, the most benevolent geniuses of Egypt. His symbol was an hippopotamus, or river-horse, a very treacherous and cruel animal.

Hieroglyphics.

Orus was a principal deity of the Egyptians; and, according to his hieroglyphic forms and habits, signified sometimes the sun, and sometimes the harmony of the whole mundane system. At the same time, being the offspring of Osiris and Isis, he was always represented young. He also represented the order and fitness of the several parts of the external sensible world, formed by the wisdom of Divine Providence, expressed by Isis; and by the intellect, power, and goodness of the supreme God, represented by Osiris. Hence, and also because Osiris and Isis represented physically the sun and moon, who, by their diffusive light, heat, and influence, preserve the visible system, Orus was called their offspring.

To express the hieroglyphic mean of Orus, as representing the world, he was represented with a staff, upon the top of which was the head of the upupa, to signify, by the variegated feathers of that bird, the beautiful variety of the creation. In one of his hands he held a lituus, to denote the harmony of the system; and a gnomon in the other, to shew the perfect proportions of its parts. Behind him was a triangle inscribed in a circle, to signify that the world was made by the unerring wisdom of God. He had also sometimes a cornucopia in his hand, to denote the fertility and productions of the earth.

Harpocrates was described holding one of his fingers on his lips, to denote the mysterious and ineffable nature of God; and that the knowledge of him was to be searched after, with profound and silent meditation, and, at the same time, that they are not to be uttered or divulged.

Upon the whole, almost all the Egyptian deities and symbols centered in two, namely, Osiris and Isis; who represented, under various hieroglyphic forms, both the celestial and terrestrial system, together with all the divine attributes, operations, and energy, which created, animated, and preserved them.

The Egyptians likewise concealed their moral philosophy under hieroglyphic symbols; but these were not the subjects of the hieroglyphics delineated on obelisks. And as hieroglyphic and symbolical figures were very ancient in Egypt, and first invented, at least formed into a system, there; so they were thence carried into other countries, and imitated in all religious mysteries as well as in political and moral science.

The preceding symbolical figures making the substance of hieroglyphics, and all belonging to Osiris, his family, and contemporaries, they were probably formed into a system soon after the death of those herods, by some who had been instructed, in the art of hieroglyphics, by Hermes the inventor of them. The first he formed himself; and the others were probably added by his learned successors, who had been instructed by him in all his mysterious learning.

This hieroglyphic system was, in its beginning, more simple, and less compounded, than afterwards; for it had been improving for several ages before it appeared on the obelisks of the temples. And hence we may infer the time of the first Egyptian hieroglyphic symbols; for, in all probability, they were not older than the time of the famous Hermes, who flourished in the reign, and some time after the death, of Osiris.

The hieroglyphic symbols were, in early times, car-

ried into Greece; and gave the first occasion to the fables of the poets, with regard to the metamorphoses of the gods, which they improved from inventions of their own; and from the knowledge of them, the Greeks ascribed peculiar arts and inventions to their gods, whose names they first received from Egypt.

But besides the hieroglyphics in common use among the people, the Egyptian priests had certain mystical characters, in which they wrapped up and concealed their doctrines from the vulgar. It is said that these something resembled the Chinese characters, and that they were also the invention of Hermes. Sir John Marsham conjectures, that the use of these hieroglyphical figures of animals introduced the strange worship paid them by that nation: for as these figures were made choice of according to the respective qualities of each animal, to express the qualities and dignity of the persons represented by them, who were generally their gods, princes, and great men, and being placed in their temples as the images of their deities, hence they came to pay a superstitious veneration to the animals themselves.

HIEROGRAMMATISTS, i. e. *holy registers*, were an order of priests among the ancient Egyptians, who presided over learning and religion. They had the care of the hieroglyphics, and were the expositors of religions doctrines and opinions. They were looked upon as a kind of prophets; and it is pretended that one of them predicted to an Egyptian king, that an Israelite (meaning Moses), eminent for his qualifications and achievements, would lessen and depress the Egyptian monarchy.

HIEROMANCY, in antiquity, that part of divination which predicted future events from observing the various things offered in sacrifice. See **DIVINATION** and **SACRIFICE**.

HIEROMNEMON, the name of an officer in the Greek church, whose principal function it was to stand behind the patriarch at the sacraments and other ceremonies of the church, and to shew him the prayers, psalms, &c. in the order in which they were to be heard.

HIERONYMUS. See **JEROME**.

HIEROPHANTES, in Grecian antiquity, the name by which the Athenians called those priests and priestesses who were appointed by the state to have the supervisal of things sacred, and to take care of the sacrifices.

HIEROPHYLAX, an officer in the Greek church, who was guardian or keeper of the holy utensils, vestments, &c. answering to our *sacrista* or vestry-keeper.

HIGH, a term of relation, importing one thing's being superior or above another: thus we say, a *high* mountain, the *high* court of parliament, *high* relieve, &c.

HIGH, in music, is sometimes used in the same sense with *loud*, and sometimes in the same sense with *acute*.

HIGH Dutch, is the German tongue in its greatest purity, &c. as spoken in Misnia, &c.

HIGH Operation, in chirurgery, is a method of extracting the stone; thus called, because the stone is taken out at the upper part of the bladder. See **SURGERY**.

Hierogrammatists
||
High.

High
in
Highland-
ders.

HIGH Way, a free passage for the king's subjects; on which account it is called the *king's high-way*, though the freehold of the soil belong to the owner of the land. Those ways that lead from one town to another, and such as are drift or cart ways, and are for all travellers in great roads, or that communicate with them, are high-ways only; and as to their reparation, are under the care of surveyors.

HIGHAM FERRERS, an ancient borough of Northamptonshire in England, which has its name from the family of the Ferrers, to whom it formerly belonged, and who had a castle in its neighbourhood. It sends one member to parliament. E. Lon. 1. 40. N. Lat. 52. 20.

HIGHGATE, a village five miles north of London. It has its name from its high situation, and from a gate set up there about 400 years ago, to receive toll for the bishop of London, when the old miry road from Gray's-inn lane to Barnet was turned through the bishop's park. There was a hermitage where the chapel now stands; and one of the hermits caused a causeway to be made between Highgate and Islington, with gravel dug out of the top of the hill, where there is now a pond. Near the chapel, in 1562, lord chief baron Cholmondeley built and endowed a free school, which was enlarged, in 1570, by Edwin Sandys, bishop of London.—This village is a noted and airy retirement for the gentry and wealthy citizens; and is a place of good accommodation, besides its affording a delightful and pleasant prospect over the city and adjacent country.

HIGHLANDERS, the inhabitants of the mountainous parts of Scotland, to the north and north-west, including those of the Hebrides or Western Isles.—They are a branch of the ancient Celts; and undoubtedly the descendants of the first inhabitants of Britain, as appears from the many monuments of their language still retained in the most ancient names of places in all parts of the island. The Highlanders, or, as they are often termed by ancient authors, the *Caledonians*, were always a brave, warlike, and hardy race of people; and, in the remotest times, seem to have possessed a degree of refinement in sentiment and manners, then unknown to the other nations that surrounded them. This appears not only from their own traditions and poems, but also from the testimony of many ancient authors. This civilization was probably owing in a great measure to the order of the Bards, or Druids, and some other institutions peculiar to this people.

The ancient Highlanders lived in the hunting state till some time after the æra of Fingal, who was one of their kings, towards the close of the third century. For some ages after that, they turned their chief attention to the pastoral life, which afforded a less precarious subsistence. Till of late, agriculture in most parts of the Highlands, made but little progress.

The Highlanders always enjoyed a king and government of their own, till Kenneth MacAlpin, (anno 845,) after having subdued the Pictish kingdom, transferred thither the seat of royalty. This event proved very unfavourable to the virtues of the Highlanders, which, from this period, began to decline. The country, no longer awed by the presence of the sovereign, fell into anarchy and confusion. The chief-

tains began to extend their authority, to form factions, and to foment divisions and feuds between contending clans. The laws were either too feeble to bind them, or too remote to take notice of them. Hence sprung all those evils which long disgraced the country, and disturbed the peace of its inhabitants. Robbery or plunder, providing it was committed on any one of an adverse clan or tribe, was countenanced and authorized; and their reprisals on one another were perpetual. Thus quarrels were handed down from one generation to another, and the whole clan were bound in honour to espouse the cause of every individual that belonged to it. By this means the genius of the people was greatly altered; and the Highlanders of a few ages back were almost as remarkable for their irregular and disorderly way of life, as their predecessors were for their civilization and virtue. It is from not attending to this distinction between the ancient Highlanders and their posterity in later times, that many have doubted the existence of those exalted virtues ascribed by their poets to the more ancient inhabitants of the country. But now that the power of the chieftains is again abolished, law established, and property secured, the genius of the people (where it is not hindered by some other extraneous cause) begins again to shew itself in its genuine colours; and many of their ancient virtues begin to shine with conspicuous lustre. Justice, generosity, honesty, friendship, peace and love, are perhaps nowhere more cultivated than among this people. But one of the strongest features which marked the character of the Highlanders in every age, was their hospitality and benevolence to strangers. At night the traveller was always sure to find a hearty welcome in whatever house he should go to; and the host thought himself happier in giving the entertainment, than the guest in receiving it. Even with regard to their enemies, the laws of hospitality were observed with the most sacred regard. They who fought against each other in the day, could in the night feast, and even sleep together, in the same house. From the same principle, they were, in most other cases, so faithful to their trust, that they rarely betrayed any confidence reposed in them. A promise they thought as binding as an oath, and held it equally inviolable and sacred.

The Caledonians in all ages have been much addicted to poetry and music. The poems of Ossian, so universally repeated, and so highly esteemed by every Highlander, are a strong proof of the early proficiency of this people in the poetical art. Even to this day, notwithstanding the many disadvantages they labour under, the most illiterate of either sex discover frequently a genius for poetry, which often breaks forth in the most natural and simple strains, when love, grief, joy, or any other subject of song, demands it. Wherever their circumstances are so easy as to allow them any respite from toil, or any cheerfulness of spirits, a good portion of their time, especially of the winter-nights, is still devoted to the song and tale. This last species of composition is chiefly of the novel-kind, and is handed down by tradition like their poems. It was the work of the bards; and proved, while they existed, no contemptible entertainment. But since the extinction of that order, both the Galic poems and tales

Highland-
ders.

Highlander tales are, in a great measure, either lost or adulterated. —The genius and character of the Galic poetry is well known. It is tender, simple, beautiful, and sublime.

Among the ancient Highlanders, the harp was the chief instrument of music. It suited the mildness of their manners, and was well adapted to the peace and quiet which they enjoyed under their own kings. In a later period, however, when the constant quarrels of their chiefs, and the endless feuds of contending clans, turned all their thoughts to war, it was forced to give place to the bag-pipe, an instrument altogether of the martial kind, and therefore well suited to the state of the country at that time. But ever since the cause which had brought this instrument in vogue has ceased to operate, the attention to it has been on the decline; so that the harp, with very little encouragement, might again resume the feat from which it was once expelled.

—The most, and especially the oldest of the Highland music, having been composed to the harp, is of a soft, tender, and elegiac cast, as best suited the genius of that instrument. These pieces are generally expressive of the passions of love and grief. Other pieces, which were composed in their state of war, and adapted to a different instrument, are altogether bold and martial. And many are of a sprightly and cheerful cast, the offspring of mirth, and the sport of fancy in the season of festivity. Many of these last are of the chorus kind; and are sung in almost all the exercises in which a number of people are engaged, such as rowing, reaping, fulling, &c. The time of these pieces is adapted to the exercises to which they are respectively sung. They greatly forward the work, and alleviate the labour. The particular musick which is generally used by the Highlanders in their dances is well known by the name of *Strathspey reels*.

The language of the Highlanders is still the Galic; which, with many of their customs and manners, has been secured to them by their mountains and fastnesses, amidst the many revolutions which the rest of the island has undergone in so long a course of ages. The Galic seems to be the oldest and purest dialect which remains of the Celtic, as appears from its approaching the nearest to the names of places, &c. which that language left in most countries where it prevailed, and from its most obvious affinity to those tongues, ancient or modern, which have been in any measure derived from the old Celtic. The Galic has all the marks of an original and primitive language. Most of the words are expressive of some property or quality of the objects which they denote. This, together with the variety of its sounds (many of which, especially of those that express the soft and mournful passions, are peculiar to itself), renders it highly adapted for poetry. It is generally allowed to have been the language of court, in Scotland, till the reign of Malcom Canmore. The Galic epithet of *Can-mor*, or "large head," by which this king is distinguished, seems to intimate so much. In some particular parliaments at least, it was spoken much later, as in that held by Robert the Bruce at Ardchattan. That it has been formerly a good deal cultivated, appears from the style and complexity of its poems and tales, and from several ancient MSS. that have come down to the present times. To strangers the Galic has a forbidding aspect, on ac-

VOL. V.

count of the number of its quiescent consonants (which are retained to mark the derivation of words and their variation in case and tense), but its sound is abundantly musical and harmonious; and its genius strong and masculine. Its alphabet consists of 18 letters, of which one is an aspirate, 12 are consonants, and five are vowels.

The Highlanders are beginning of late to apply to learning, agriculture, and especially to commerce, for which their country, every where indented with arms of the sea, is peculiarly favourable. Cattle is the chief staple of the country; but it produces more grain than would supply its inhabitants, if so much of it were not consumed in whisky. The natives are beginning to avail themselves of their mines, woods, wool, and fisheries; and by a vigorous application, with the due encouragement of government, may become a prosperous and useful people.

The Highlanders are of a quick and penetrating genius, strongly tinged with a curiosity or thirst of knowledge, which disposes them to learn anything very readily. They are active and industrious, where oppression does not discourage them by secluding even the hope of thriving. They are remarkably bold and adventurous, which qualifies them for being excellent seamen and soldiers. They are generally of a middle size, rather above it than otherwise; their eyes are bright and lively, their features distinctly marked, and their persons tight and well made. Their countenance is open and ingenuous, and their temper frank and communicative.

HIGHNESS, a quality, or title of honour given to princes.—The kings of England and Spain had formerly no other title but that of *highness*; the first till the time of James I. and the second till that of Charles V. The petty princes of Italy began first to be complimented with the title of *highness* in the year 1630.—The duke of Orleans assumed the title of *royal highness* in the year 1631, to distinguish himself from the other princes of France.

The duke of Savoy, late king of Sardinia, bore the title of *royal highness*, on account of his pretensions to the kingdom of Cyprus.—It is said that duke only took the title of *royal highness*, to put himself above the duke of Florence, who was called *great duke*; but the great duke afterwards assumed the title of *royal highness*, to put himself on a level with the duke of Savoy.

The prince of Comde first took the title of *most serene highness*, leaving that of simple *highness* to the natural princes.

HILARIA, an ancient Roman festival, observed on the eighth of the kalends of April, or the 25th day of March, in honour of the goddess Cybele. It was so called from the various expressions of joy and mirth on this occasion.

HILARIUS, an ancient father of the Christian church, who flourished in the 4th century. He was born, as St Jerome informs us, at Poitiers, of a good family; who gave him a liberal education in the Pagan religion, and which he did not forsake till he was arrived at maturity. He was advanced to the bishopric of Poitiers in the year 355, according to Baronius; and became a most zealous champion for the orthodox faith, particularly against the Arians, who were

Hilarodi

Hill.

were at that time gaining ground in France. He assembled several councils there, in which the determinations of the synods of Rimini and Seleucia were condemned. He wrote a treatise concerning synods; and a famous work in 12 books on the Trinity, which is much admired by the orthodox believers. He died in the latter end of the year 367. His works have been many times published; but the last and best edition of them was given by the Benedictines at Paris in 1693.

HILARODI, in the ancient music and poetry, a sort of poets among the Greeks, who went about singing little gay poems or songs, somewhat graver than the Ionic pieces, accompanied with some instrument. From the streets they were at length introduced into tragedy, as the magodi were into comedy. They appeared dressed in white, and were crowned with gold. At first they wore shoes; but afterwards they assumed the crepida, being only a sole tied over with a strap.

HILARY-TERM. See **TERM.**

HILDESHEIM, a small district of Germany, in the circle of Lower Saxony. It lies between the duchies of Lunenburg and Brunswick; and may be about 25 miles from east to west, and 36 from north to south. It is watered by the rivers Leine and Innerfity. The soil is fertile; and its principal places are Peine, Sarstedt, Broggen, and Alveld. Hildesheim, from whence it takes its name, is governed as an imperial city. Its bishop is now elector of Cologne.

HILDESHEIM, a strong city of Germany, in Lower Saxony, with a Roman-catholic bishop's see, whose bishop is sovereign. It is a free imperial city, tho' in some things dependent on the bishop. It is a large town, well built and fortified. It is divided into the Old Town and the New, which have each their separate council. It is seated on the river Innerfity, in E. Long. 10. 0. N. Lat. 52. 17.

HILL, a term denoting any considerable eminence on the earth's surface. It is sometimes synonymous with the word *mountain*; though generally it denotes only the lesser eminences, the word *mountain* being particularly applied to the very largest. See **Mountain**.

HILL (Aaron), a poet of considerable eminence, the son of a gentleman of Malmesbury-abbey in Wiltshire, was born in 1685. His father's imprudence having cut off his paternal inheritance, he left Westminster school at 14 years of age; and embarked for Constantinople, to visit lord Paget the English ambassador there, who was his distant relation. Lord Paget received him with surprise and pleasure, provided him a tutor, and sent him to travel: by which opportunity he saw Egypt, Palestine, and a great part of the east; and returning home with his noble patron, visited most of the courts of Europe. About the year 1709, he published his first poem intitled *Camillus*, in honour of the earl of Peterborough who had been general in Spain; and being the same year made master of Drury-lane theatre, he wrote his first tragedy, *Elfrid*, or *the fair Inconstant*. In 1710, he became master of the opera-house in the Hay-market; when he wrote an opera called *Rinaldo*, which met with great success, being the first that Mr Handel set to music after he came to England. Unfortunately for Mr Hill, he was a pro-

jector as well as poet, and in 1715 obtained a patent for extracting oil from beech-nuts; which undertaking, whether good or bad, miscarried after engaging three years of his attention. He was also concerned in the first attempt to settle the colony of Georgia; from which he never reaped any advantage; and in 1728 he made a journey into the Highlands of Scotland, on a scheme of applying the woods there to ship-building; in which also he lost his labour.

Mr Hill seems to have lived in perfect harmony with all the writers of his time, except Mr Pope, with whom he had a short paper-war, occasioned by that gentleman's introducing him in the *Dunciad*, as one of the competitors for the prize offered by the goddess of Dullness, in the following lines.

"Then Hill essay'd; scarce vanish'd out of sight,
"He buoy'd up an infant, and returns to light;
"He bears no token of the fibler's dreams,
"And mounts far off among the Swans of Thames."

This, though far the gentlest piece of satire in the whole poem, and conveying at the same time an oblique compliment, roused Mr Hill to take some notice of it; which he did by a poem written during his perigrination in the north, intitled, "The progress of wit, a caveat for the use of an eminent writer;" which he begins with the following eight lines, in which Mr Pope's too well known disposition is elegantly, yet very severely, characterized:

"Tuneful *Alexis* on the Thames' fair side,
"The Ladies play-thing and the Muses' pride;
"With merit popular, with wit polite,
"Easy tho' vain, and elegant tho' light;
"Desiring and deferring others praise;
"Poorly accepts a Fame he ne'er repays;
"Unborn to cherish, *sneakingly* approves;
"And wants the soul to spread the worth he loves."

The *sneakingly* approves, in the last couplet, Mr Pope was much affected by; and indeed, thro' their whole controversy afterwards, in which it was generally thought that Mr Hill had much the advantage, Mr Pope seems rather to express his repentance by denying the offence, than to vindicate himself supposing it to have been given.

Besides the above poems, Mr Hill, among many others, wrote one, called *The northern star*, upon the actions of Czar Peter the Great; for which he was several years afterwards complimented with a gold medal from the empress Catharine, according to the Czar's desire before his death. He likewise altered some of Shakespeare's plays, and translated some of Voltaire's. His last production was *Merope*; which was brought upon the stage in Drury-lane by Mr Garrick. He died on the eighth of February 1749, as it is said, in the very minute of the earthquake; and after his decease four volumes of his works in prose and verse were published in octavo, and his dramatic works in two volumes.

HILL (Sir John), a voluminous writer, was originally bred an apothecary; but his marrying early, and without a fortune, made him very soon look round for other resources than his profession. Having, therefore, in his apprenticeship, attended the botanical lectures of the company, and being possessed of quick natural parts, he soon made himself acquainted with the theoretical as well as practical parts of botany; from

Hill.

Hill,
Hillel.

Hillel
Hippocrates

from whence being recommended to the late duke of Richmond and lord Petre, he was by them employed in the inspection and arrangement of their botanic gardens. Affixed by the liberality of these noblemen, he executed a scheme of travelling over the kingdom, to collect the most rare and uncommon plants; which he afterward published by subscription; but after great researches and uncommon industry, this undertaking turned out by no means adequate to his expectation. The stage next presented itself, as a foil in which genius might stand a chance of flourishing; but after two or three unsuccessful attempts, it was found he had no pretensions either to the sock or bulkin; which once more reduced him to his botanical pursuits, and his business as an apothecary. At length, about the year 1746, he translated from the Greek a small tract, written by Theophrastus, *On gems*, which he published by subscription; and which, being well executed, procured him friends, reputation, and money. Encouraged by this, he engaged in works of greater extent and importance. The first he undertook was *A general natural history*, in 3 vols. folio. He next engaged, in conjunction with George Lewis Scott, esq; in furnishing a *Supplement to Chambers's Dictionary*. He at the same time started the British Magazine; and while he was engaged in a great number of these and other works, some of which seemed to claim the continued attention of a whole life, he carried on a daily essay, under the title of *Inspector*. Amidst this hurry of business, Mr Hill was so laborious and ready in all his undertakings, and was withal so exact an oeconomist of his time, that he scarcely ever missed a public amusement for many years: where, while he relaxed from the feverish pursuits of study, he gleaned up articles of information for his periodical works. It would not be easy to trace Mr Hill, now Dr Hill, (for he procured a diploma from the college of St Andrews,) through all his various pursuits in life. A quarrel he had with the Royal Society, for being refused as a member, which provoked him to ridicule that learned body, in *A review of the works of the Royal Society of London*, 4to, 1751; together with his over-writing himself upon all subjects without reserve; made him sink in the estimation of the public nearly in the same pace as he had ascended. He found as usual, however, resources in his own invention. He applied himself to the preparation of certain simple medicines: such as the essence of water-dock, tincture of valerian, balsam of honey, &c. The well-known simplicity of these medicines, made the public judge favourably of their effects, inasmuch that they had a rapid sale, and once more enabled the doctor to figure in that style of life ever so congenial to his inclination. Soon after the publication of the first of these medicines, he obtained the patronage of the earl of Bute, through whose interest he acquired the management of the royal gardens at Kew, with an handsome salary: and to wind up the whole of an extraordinary life, having, a little before his death, seized an opportunity to introduce himself to the knowledge of the king of Sweden, that monarch invested him with one of the orders of his court, which title he had not the happiness of enjoying above two years. He died toward the close of the year 1775.

HILLEL, senior, of Babylon, president of the

fanhedrim of Jerusalem. He formed a celebrated school there, in which he maintained the oral traditions of the Jews against Shamai, his colleague, whose disciples adhered only to the written law; and this controversy gave rise to the sects of Pharisees and Scribes. He was likewise one of the compilers of the Talmud. He also laboured much at giving a correct edition of the sacred text; and there is attributed to him an ancient manuscript bible, which bears his name. He flourished about 30 years B. C. and died in a very advanced age.

HILLEL, the nasi, or prince, another learned Jew, the grandson of Judas Hakkadosh, or the Saint, the author of the Mishna, lived in the fourth century. He composed a cycle; and was one of the principal doctors of the Gamara. The greatest number of the Jewish writers attribute to him the correct edition of the Hebrew text which bears the name of *Hillel*, which we have already mentioned in the preceding article. There have been several other Jewish writers of the same name.

HILUM, among botanists, denotes the eye of a bean.

HIN, a Hebrew measure of capacity for things liquid, containing the sixth part of an ephah, or one gallon two pints English measure.

HIND, a female stag in the third year of its age. See CERVUS.

HINDON, a small town of Wiltshire in England, which sends two members to parliament. It is situated in E. Long. 2. 14. N. Lat. 51. 12.

HINE, or HIND, a husbandman's servant. Thus the person who oversees the rest, is called the master's hine.

HIPPARCHUS, a great astronomer, born at Nice in Bithynia, flourished between the 154th and 163d Olympiads. His commentary upon Aratus's phenomena is still extant. Rohault was very much mistaken when he asserted, that this astronomer was not acquainted with the particular motion of the fixed stars from west to east, by which their longitude changes. By foretelling eclipses, he taught mankind not to be frightened at them, and that even the gods were bound by laws. Pliny, who tells this, admires him for making a review of all the stars; by which his descendants would be enabled to discover whether they are born and die, whether they change their place, and whether they increase and decrease.

HIPPOBOSCA, or HORSE-FLY, in zoology, a genus of insects, belonging to the order of diptera. The beak consists of two valves, is cylindrical, obtuse, and hanging; and the feet have several claws. There are four species, distinguished by their wings, &c. The equina is very troublesome to horses.

HIPPOCAMPUS, in ichthyology. See SYNGNATHUS.

HIPPOCENTAUR, in antiquity, a fabulous animal, half man and half horse.

What gave rise to the fable of Hippocentaurs was this. The Thessalians are said to have been the first inventors of the art of breaking horses; and being first seen on horseback, they seemed to make but one body with the horses; whence the fable took its rise.

HIPPOCRATES, the greatest physician of antiquity,

Hippocrates quity, was born in the island of Cos in the 80th Olympiad, and flourished at the time of the Peloponnesian war. He was the first that we know of who laid down precepts concerning physic; and, if we may believe the author of his life, who goes under the name of *Soranus*, drew his original from Hercules and *Asclepius*. He was first a pupil of his own father *Heralclides*, then of *Herodicus*, then of *Gorgias* of *Leontium* the orator, and, according to some, of *Democritus* of *Abdera*. After being instructed in physic, and in the liberal arts, and losing his parents, he left his own country, and practised physic all over Greece; where he was so much admired for his skill, that he was publicly sent for with *Euryphon*, a man superior to him in years, to *Perdiccas* king of *Macedonia*, who was then thought to be consumptive. But *Hippocrates*, as soon as he arrived, pronounced the disease to be entirely mental, as in truth it was. For upon the death of his father *Alexander*, *Perdiccas* fell in love with *Phyllas*, his father's mistress: and this *Hippocrates* discerning by the great change her presence always wrought upon him, a cure was soon effected.

Being intreated by the people of *Abdera* to come and cure *Democritus* of a supposed madness, he went; but, upon his arrival, instead of finding *Democritus* mad, he found all his fellow-citizens fo, and *Democritus* the only wise man among them. He heard many lectures, and learned much philosophy from him; which has made *Cornelius Celsus* and some others imagine, that *Hippocrates* was the disciple of *Democritus*, though it is probable they never saw each other till this interview which was occasioned by the *Abderites*. *Hippocrates* had also public invitations to other countries. Thus, when a plague invaded the *Illyrians* and *Pæonians*, the kings of those countries begged him to come to their relief: he did not go; but learning from the messengers the course of the winds there, he concluded that the distemper would come to *Athens*; and, foretelling what would happen, applied himself to take care of the city and the students. He was indeed such a lover of Greece, that when his fame had reached as far as *Persia*, and upon that account *Artaxerxes* had intreated him by his governor of the *Hellestont*, with a promise of great rewards, to come to him, he refused to go. He also delivered his own country from a war with the *Athenians*, that was just ready to break out, by prevailing with the *Thessalians* to come to their assistance, for which he received very great honours from the *Coans*. The *Athenians* also conferred great honours upon him; they admitted him next to *Hercules* in the *Eleusian* ceremonies; gave him the freedom of the city; and voted a public maintenance for him and his family in the *prytæneum* or council-house at *Athens*, where none were maintained at the public charge but such as had done signal service to the state. He died among the *Larissæans*, some say in his 90th year, some in his 87th, others in his 104th, and some in his 109th. The best edition of his works is, that of *Fœsius*, in Greek and Latin. *Hippocrates* wrote in the *Ionian* dialect. His aphorisms, prognostics, and all that he has written on the symptoms of diseases, justly pass for master-pieces. See *History of Medicine*.

HIPPOCREPIS, COMMON HORSE-SHOE VETCH; a genus of the *decandria* order, belonging to the *diadel-*

phia class of plants. There are three species, two natives of the warm parts of Europe, and one of Britain. They are all low herbaceous trailing plants, with yellow flowers. They are propagated by seeds; but having, no great beauty are seldom kept in gardens.

HIPPODROME, in antiquity, the course where horse-races were performed.

HIPPOGLOSSUS, in ichthyology; a species of *PLEURONECTES*.

HIPPOMANE, the *MANCHINEEL-TREE*; a genus of the *adelphia* order, belonging to the *monœcia* class of plants.

Species. 1. The *manicella*, with oval sawed leaves, is a native of all the West India islands. It hath a smooth brownish bark; the trunk divides upward into many branches, garnished with oblong leaves about three inches long. The flowers come out in short spikes at the end of the branches, but make no great appearance, and are succeeded by fruit of the same shape and size with a golden pippin. The tree grows to the size of a large oak. 2. The *biglandulosa*, with oblong bay leaves, is a native of South America; and grows to as large a size as the first, from which it differs mostly in the shape of its leaves. 3. The *spinosa*, with holly leaves, is a native of *Campeachy*, and seldom rises above 20 feet high; the leaves greatly resemble those of the common holly, and are set with sharp prickles at the end of each indenture. They are of a lucid green, and continue all the year.

Culture. These plants being natives of very warm climates, cannot be preserved in this country without a stove; nor can they by any means be made to rise above five or six feet high even with that assistance. They are propagated by seeds; but must have very little moisture, or they will certainly be killed by it.

Properties. These trees have a very poisonous quality, abounding with an acrid milky juice of a highly caustic nature. Strangers are often tempted to eat the fruit of the first species; the consequences of which are, an inflammation of the mouth and throat, pains in the stomach, &c. which are very dangerous unless remedies are speedily applied. The wood is much esteemed for making cabinets, book-cases, &c. being very durable, taking a fine polish, and not being liable to become worm-eaten: but as the trees abound with a milky caustic juice already mentioned, fires are made round their trunks, to burn out this juice; otherwise those who fell the trees would be in danger of losing their sight by the juice flying in their eyes. This juice raises blisters on the skin wherever it falls, turns linen black, and makes it fall out in holes. It is also dangerous to work the wood after it is sawn out; for if any of the saw-dust happens to get into the eyes of the workmen, it causes inflammations and the loss of sight for some time; to prevent which, they generally cover their faces with fine lawn during the time of working the wood.

HIPPOMANES, a sort of poison famous among the ancients as an ingredient in amorous philters or love-charms. The word is Greek, *ἵππος*, composed of *ἵππος*, "a horse," and *μανία*, "fury, or madness."

Authors are not agreed about the nature of the *Hippomanes*. *Pliny* describes it as a blackish caruncle found

Hippodrome
||
Hippomanes.

found on the head of a new-born colt; which the dam bites off and eats as soon as she is delivered. He adds, that if she is prevented herein by any one's cutting it off before, she will not take to nor bring up the young. Virgil, and after him Servius and Columella, describe it as a poisonous matter trickling from the pudendum of a mare when proud, or longing for the horse. At the end of Mr Bayle's Dictionary is a very learned dissertation on the *hippomanes*, and all its virtues both real and pretended.

HIPPOPHAE, SEA-BUCKTHORN; a genus of the tetrandria order, belonging to the diœcia class of plants.

Species. 1. The *rhannoides* hath a shrubby stem, branching irregularly eight or ten feet high, having a dark brown bark. It is armed with a few thorns; hath spear-shaped, narrow, sessile leaves, of a dark green above, and hoary underneath. 2. The *canadensis* hath a shrubby brown stem, branching eight or ten feet high, with oval leaves, and male and female flowers on different plants.

Culture, &c. Both these species are very hardy, and may be propagated in abundance by suckers from the roots, by layers, and by cuttings of their young shoots. They are retained in gardens, on account of their two-coloured leaves in summer; and in winter, on account of the appearance of the young shoots, which are covered with turgid, irregular, scaly buds. Goats, sheep, and horses, eat the first species; cows refuse it.

HIPPOTAMUS, the RIVER-HORSE; a genus of quadrupeds, belonging to the order of belluæ; the characters of which are these: it has six fore-teeth in the upper jaw, disposed in pairs at a distance from each other; and four prominent fore-teeth in the under jaw, the intermediate ones being longest: the dog-teeth are solitary and obliquely truncated; and the feet are hoofed on the edges.

There is but one species of hippopotamus, viz. the amphibius, or river-horse. The history of this quadruped, though next to the elephant in magnitude, is far from being sufficiently delineated. The best description hitherto given of him is that of Frederic Zerenghi, an Italian surgeon, published in the year 1603. Zerenghi killed two of them (a male and a female) on the banks of the Nile, preserved their skins, and brought them to Rome. Every skin took 400 pounds of salt in curing. He says, the skin of the hippopotamus is about an inch thick, extremely hard, impenetrable by a common mallet-ball; and there are only a few short white hairs scattered very thin over it. The teeth are not protruded out of the mouth, as is commonly believed; for, when the mouth is shut, although the teeth be extremely large, they are entirely covered by the lips. The dimensions of the female, of which Zerenghi gives a figure, are as follow: from the point of the muzzle to the origin of the tail, between 11 and 12 feet; the circumference of the body, about 10 feet; the height of the body, 4½ feet; the circumference of the leg, near the shoulder, 2 feet 9 inches, lower down 1 foot 9½ inches; the height of the legs about 1½ feet; the length of the feet from the extremity of the claws, 4½ inches: the claws are nearly of an equal length and breadth, and are somewhat more than two inches; each toe is furnished with a claw, and each foot has four toes. The tail is a-

bout one foot long, more than a foot in circumference near the origin, and about 3 inches near the point. The tail is not round, but flatfish. The head, from the extremity of the lips to the neck, is about 2 feet 4 inches, and the circumference 5 feet 8 inches. The ears are about 3 inches long, and nearly as broad; they are a little pointed, and covered in the interior side with short white hair. The mouth, when open, is about 1½ foot wide, and furnished with 44 teeth of different figures. Their teeth are of such a hard substance, that they give fire with steel. These dimensions are taken from a female hippopotamus; but the male is generally about one third larger.

With such powerful arms, and such a prodigious strength of body, the hippopotamus might render himself formidable to every other animal. But he is naturally of a mild disposition; and besides, his body is so heavy, and his motions so slow, that he cannot overtake any other quadruped. He swims swifter than he runs, and preys upon fishes. He dives in the water, and can stay very long under. He has no membrane betwixt his toes, as the callos or the otter; and he only swims easily in consequence of the great bulk of his belly, which makes him nearly of an equal specific gravity with the water. Moreover, he often keeps himself at the bottom, and walks upon the channel with the same freedom as upon dry land. Besides preying upon fishes, crocodiles, &c. he frequently goes out of the water, and feeds upon sugar-canes, rushes, millet, rice, roots, &c. These he devours in large quantities, and often does great damage in the cultivated field. But as he is more timid on land than in the water, he is easily driven away. His legs are so short, that he cannot escape by flight when at a distance from the river. He generally flies when approached by people in boats; but, if they wound him, he returns with fury, attacks the boats with his teeth, and frequently overlets them.

This animal seems to be confined principally to the rivers of Africa. The male and female generally go together, and the female is said to produce but one at a time.

Concerning this creature Mr Hasselquist relates the following particulars, which he says he had from a credible person who lived 12 years in Egypt.

"1. The hide of a full-grown hippopotamus is a load for a camel.

"2. The river-horse is an inveterate enemy to the crocodile, and kills it whenever he meets it. This, with some other reasons, contributes much to the extirpation of the crocodile; which, otherwise, considering the many eggs they would lay, would utterly destroy Egypt.

"3. "The river-horse never appears below the cataracts in Egypt; wherefore the inhabitants of Upper Egypt only can give an account of it; and as very few Europeans, none at least who understand natural history, have travelled into those parts of Egypt, we know little of the history of this animal; such as have travelled in India, have had better opportunities of informing themselves in this matter. The Egyptians very seldom bring the hide of it to Cairo; and it is impossible to bring thither the living animal. A hide has been sent to France, which, I am informed, is preserved in the royal menagerie.

Hippopotamus
||
Hirch-horn

4. "The river-horse does much damage to the Egyptians in those places he frequents. He goes on shore, and in a short space of time destroys an entire field of corn or clover, not leaving the least verdure as he passes: for he is voracious, and requires much to fill his great belly. They have a curious manner of freeing themselves, in some measure, from this destructive animal. They remark the places he frequents most, and there lay a large quantity of pease: when the beast comes on shore, hungry and voracious, he falls to eating what is nearest him; and filling his belly with the pease, they occasion an insupportable thirst: he then returns immediately into the river, and drinks upon these dry peas large draughts of water, which suddenly causes his death; for the pease soon begin to swell with the water, and not long after the Egyptians find him dead on the shore, blown up, as if killed with the strongest poison.

5. "The oftener the river-horse goes on shore, the better hopes have the Egyptians of a sufficient swelling or increase of the Nile.

6. "The Egyptians say, they can almost distinguish the food of this animal in his excrement."

Mr Pennant in his *Synopsis*, p. 80. treats the enmity of the hippopotamus and crocodile as a vulgar error; an eye-witness, he tells us, declaring he had seen them swimming together without any disagreement. "They are (says he) capable of being tamed. Belon says, he has seen one so gentle as to be let loose out of a stable, and fed by its keeper, without attempting to injure any one. They are generally taken in pitfalls, and the poor people eat the flesh. In some parts, the natives place boards full of sharp irons in the corn-grounds; which these beasts strike into their feet, and so become an easy prey. Sometimes they are struck in the water with harpoons fastened to cords, and 10 or 12 canoes are employed in the chase. The teeth are most remarkably hard, even harder than ivory, and much less subject to turn yellow. Des Marchais says, that the dentists prefer them for the making of false teeth. The skin when dried is used to make bucklers, and is of impenetrable hardness. It is the *behemoth* of Job, and was known to the Romans. An ancient writer asserts, that these animals were found in the Indus; which is not confirmed by any modern traveller."

HIPPURIS, MARE'S-TAIL; a genus of the monandria order, belonging to the monogynia class of plants. There is only one species, a native of Britain, and which grows in ditches and stagnant waters. The flower of this plant is found at the base of each leaf, and is as simple as can be conceived; there being neither empalement nor blossom; and only one chive, one pointal, and one seed. It is a very weak astringent. Goats eat it; cows, sheep, horses, and swine, refuse it.

HIRAM, a king of Tyre, cotemporary with Solomon, whom he supplied with cedar, gold, silver, and other materials for building the temple. He died 1000 years B. C.

HIRAM of Tyre, an artist who assisted in the construction of Solomon's temple, and other public buildings at Jerusalem, flourished 1015. B. C.

HYRCANIA, (anc. geog.) See **HYRCANIA**.

HIRCH-HORN, a town of Germany, in the circle

of the lower Rhine, with a strong castle. It is seated on the side of a hill on the river Neckar, and belongs to the elector Palatine. E. Long. 9. o. N. Lat. 49. 28.

HIRE (Philip de la), an eminent French mathematician and astronomer, born at Paris in 1640. His father, who was painter in ordinary to the king, designed him for the same profession: but he devoted himself to mathematical studies, and was nominated together with M. Picard to make the necessary observations for a new map of France by the directions of M. Colbert. In 1683, he was employed in continuing the famous meridian line begun by M. Picard; and was next engaged in constructing those grand aqueducts which were projected by Lewis XIV. He died in 1718, after having wrote a great number of works, besides several occasional papers dispersed in journals, and in memoirs of the Academy of Sciences.

HIRING, in law. See **BORROWING** and **Hiring**.

HIRSBERG, a town of Silesia, in the territory of Jauer, famous for its mineral baths. It is seated on the river Bosar, in E. Long. 17. 50. N. Lat. 50. 50.

HIRSCHFELD, a town of Germany in the circle of the upper Rhine, and capital of a principality of the same name, depending on a famous abbey which was secularized in favour of the house of Cassel. It is seated on the river Fulda, in E. Long. 9. 52. N. Lat. 51. 46.

HIRUDO, the **LEECH**; a genus of insects belonging to the order of vermes intestinalia. The body moves either forward or backward. There are nine species, principally distinguished by their colour. The most remarkable are the following.

1. The medicinal, or common leech, hath an oblong brown body, marked with six yellow spots, and is an inhabitant of ponds, ditches, and other stagnant waters. This animal is well known for the purpose of bleeding, children especially. This practice is as old as the days of Pliny, who gives the creature the name of *hirudo sanguisuga*. In his time, leeches were used instead of cupping-glasses for persons of plethoric habits, and those who were troubled with the gout in the feet. He asserts, that if they left their head in the wound, as was sometimes the case, the wound was incurable; and he informs us, that Messalinus, a person of consular dignity, lost his life by such an accident. Some imagine, that leeches have a poisonous quality, because the wound they make is not always easily healed; but this depends on the habit of the body, and will also happen when the lancet is used. To make leeches fasten soon, keep them hungry, and rub the part to which they are to be applied with warm milk or blood. If they stick longer than is thought convenient, they must not be pulled off; but if their heads are touched with common salt, they soon fall off of themselves. If they are thought not to have drawn a sufficient quantity of blood, apply cloths wrung out of warm water upon the orifice; or, if convenient, put the part into warm water; and thus the bleeding may be prolonged. They are to be kept in bottles not quite filled with water, which ought to be renewed every three or four days at farthest. A little sugar may be added to the water in which they are kept. For the cases in which the application of leeches is advisable, see (the *Index* subjoined to) **MEDICINE**.

Hire
||
Hirudo.

Hirudo,
Hirundo.

Hirundo.

2. The sanguifuga, or horse-leech, hath a depressed body; in the bottom of the mouth are certain great sharp tubercles or whitish caruncles. The slenderest part is about the mouth, and the thickest about the tail. The tail itself is very slender; the belly of a yellowish green; the back dusky. This species is also a blood-sucker, though not used in medicine. The instruments with which both species perforate the skin, are found, on a nice dissection, to be a number of very fine teeth disposed in a regular order on three ribs, or jaws, placed between the aperture of the lips and the bottom of the mouth; each of them along a strong muscle of its own length. Hence the wound made by leeches consists of three cuts proceeding like radii from a centre, and making equal angles with each other. This structure of the wound is most distinctly seen when the swelling has gone down, and the skin is clean, which is usually on the fourth day.—Leeches are able to live in oil; and when taken out of this liquid and put into water again, they throw off a tender skin or film, of the regular shape of the whole body. Their being able to live in this fluid shews, that they respire by the mouth: which is also further proved, by gently warming the water in which they are kept; for then the animals being uneasy, breathe hard, and very visibly. These animals may in some shape answer the purposes of barometers; for when preferred in glasses, they predict bad weather by their great restlessness and change of place.

3. The geometra, or geometrical leech, is a native of the same places with the two former. It hath a filiform body, greenish, spotted with white; both ends dilatable, and equally tenacious. It moves as if measuring the spaces it passes over like a compass, whence its name. It is found on trout and other fish after the spawning season.

4. The muricata, or tuberculated leech, hath a taper body, rounded at the greater extremity, and furnished with two small horns; strongly annulated and tuberculated upon the rings; the tail dilated. It inhabits the sea, adheres strongly to fish, and leaves a black mark on the spot.

5. The myxine, or hag, is about eight inches long, with a slender body, carinated beneath, and an adipose or rayless fin round the tail, and under the belly. It inhabits the ocean; enters the mouths of fish, when on the hooks of lines that remain a whole tide under water; and devours the whole, except the skin and bones. The Scarborough fishermen often take it in the *robbed fish*, on drawing up their lines. Linnaeus attributes to it the property of turning water into glue.

HIRUNDO, in ornithology, a genus of birds of the order of passeres. There are twelve species, chiefly distinguished by their colour. The most remarkable are,

1. The domestica, or chimney-swallow, appears in Great Britain near 20 days before the martin, or any other of the swallow tribe. They leave us the latter end of September; and for a few days previous to their departure, they assemble in vast flocks on house-tops, churches, and even trees, from whence they take their flight. It is now known that swallows take their winter-quarters in Senegal, and possibly they may be found along the whole Morocco shore. We

are indebted to M. Adanson for this discovery, who first observed them in the month of October, after their migration out of Europe, on the shores of that kingdom: but whether it was this species alone, or all the European kinds, he is silent.

The name of *chimney-swallow* may almost be confined to Great Britain; for in several other countries they choose different places for their nests. In Sweden, they prefer barns; so are styled there *ladu-swallow*, or the *barn-swallow*: and in the hotter climates, they make their nests in porches, gate-ways, galleries, and open halls.

The house-swallow is distinguished from all others by the superior forkiness of its tail, and by the red spot on the forehead and under the chin. The crown of the head, the whole upper-part of the body, and the coverts of the wings, are black, glossed with a rich purplish blue, most resplendent in the male: the breast and belly white, that of the male tinged with red: the tail is black; the two middle feathers are plain, the others marked transversely near their ends with a white spot. The exterior feathers of the tail are much longer in the male than in the female.

Its food is the same with the others of its kind, viz. insects. For the taking of these, in their swiftest flight, nature hath admirably contrived their several parts: their mouths are very wide to take in flies, &c. in their quickest motion; their wings are long, and adapted for distant and continual flight; and their tails are forked, to enable them to turn the readier in pursuit of their prey. This species, in our country, builds in chimneys; and makes its nest of clay mixed with straw, leaving the top quite open. It lines the bottom with feathers and grasses: and usually lays from four to six eggs, white speckled with red; but, by taking away one of the eggs daily, it will successively lay as far as 19, as Dr Lister has experienced. It breeds earlier than any other species. The first brood are observed to quit the nest the last week in June, or the first in July; the last brood towards the middle or end of August. The nest being fixed five or six feet deep within the chimney, it is with difficulty that the young can emerge. They even sometimes fall into the rooms below: but as soon as they succeed, they perch for a few days on the chimney-top, and are there fed by their parents. Their next essay is to reach some leafless bough, where they sit in rows, and receive their food. Soon after they take to the wing, but still want skill to take their own prey. They hover near the place where their parents are in chase of flies, attend their motions, meet them, and receive from their mouths the offered sustenance.—It has a sweet note, which it emits in August and September, perching on house-tops.

2. The urbana, or martin, is inferior in size to the former, and its tail much less forked. The head and upper-part of the body, except the rump, is black glossed with blue: the breast, belly, and rump, are white: the feet are covered with a short white down. This is the second of the swallow-kind that appears in our country. It builds under the eaves of houses, with the same materials, and in the same form, as the house-swallow; only its nest is covered above, having only a small hole for admittance. It will also build against the sides of high cliffs over the sea. For the time.

time that the young keep the nest, the old one feeds them, adhering by the claws to the outside; but as soon as they quit it, the feeds them flying, by a motion quick and almost imperceptible to those who are not used to observe it.

It is a later breed than the preceding by some days, but both will lay twice in the season; and the latter brood of this species have been observed to come forth so late as the 18th of September; yet that year (1766) they entirely quitted our sight by the 5th of October: not but that they sometimes continue here much later; the martins and red-wing thrushes having been seen flying in view on the 7th of November. Nestlings have been remarked in Hampshire as late as the 21st of October, 1772.

3. The riparia, or sand-martin, is the least of the genus that frequents Great Britain. The head and whole upper-part of the body are mouse-coloured; the throat white, encircled with a mouse-coloured ring; the belly white; the feet smooth and black.—It builds in holes in sand-pits, and in the banks of rivers, penetrating some feet deep into the bank, boring through the soil in a wonderful manner with its feet, claws, and bill. It makes its nest of hay, straw, &c. and lines it with feathers: it lays five or six white eggs. It is the earliest of the swallow-tribe in bringing out its young.

4. The apus, or swift, is the largest of our swallows; but the weight is most disproportionately small to its extent of wing of any bird: the former being scarce one ounce, the latter 18 inches. The length near eight. The feet of this bird are so small, that the action of walking and rising from the ground is extremely difficult; so that nature hath made it full amends, by furnishing it with ample means for an easy and continual flight. It is more on the wing than any other swallows; its flight is more rapid, and that attended with a shrill scream. It rests by clinging against some wall, or other apt body; from whence Klein styles this species *hirundo muraria*. It breeds under the eaves of houses, in steeples, and other lofty buildings; makes its nest of grasses and feathers; and lays only two eggs, of a white colour. It is entirely of a glossy dark footy colour, only the chin is marked with a white spot: but by being so constantly exposed to all weathers, the gloss of the plumage is lost before it retires. A pair of these birds were found adhering by their claws, and in a torpid state, in Feb. 1766, under the roof of Longnor-chapel, Shropshire: on being brought to a fire, they revived, and moved about the room. The feet are of a particular structure, all the toes standing forward; the least consists of only one bone; the others of an equal number, viz. two each; in which they differ from those of all other birds.

This appears in our country about 14 days later than the sand-martin; but differs greatly in the time of its departure, retiring invariably about the 10th of August, being the first of the genus that leaves us.

The fabulous history of the *manucodiata*, or *bird of paradise*, is, in the history of this species, in great measure verified. It was believed to have no feet; to live upon the celestial dew; to float perpetually on the atmosphere; and to perform all its functions in that element.

The swift actually performs what has been in these enlightened times disproved of the former, except the small time it takes in sleeping, and what it devotes to incubation; every other action is done on wing. The materials of its nest it collects either as they are carried about by the winds, or picks them up from the surface in its sweeping flight. Its food is undeniably the insects that fill the air. Its drink is taken in transient sips from the water's surface. Even its amorous rites are performed on high. Few persons who have attended to them in a fine summer's morning, but must have seen them make their aerial courtes at a great height, encircling a certain space with an easy steady motion. On a sudden they fall into each others embraces, then drop precipitate with a loud shriek for numbers of yards. This is the critical conjuncture; and to be no more wondered at, than that insects (a familiar instance) should discharge the same duty in the same element.

These birds and swallows are inveterate enemies to hawks. The moment one appears, they attack him immediately: the swifts soon desert; but the swallows pursue and persecute those rapacious birds, till they have entirely driven them away.

Swifts delight in sultry thundery weather, and seem thence to receive fresh spirits. They fly at those times in small parties with particular violence; and as they pass near steeples, towers, or any edifices where their mates perform the office of incubation, emit a loud scream, a sort of serenade, as Mr White supposes, to their respective females.

Concerning the disappearance of swallows in the winter, Mr Pennant hath given the following dissertation.

"There are three opinions among naturalists concerning the manner the swallow-tribes dispose of themselves after their disappearance from the countries in which they make their summer residence. Herodotus mentions one species that resides in Egypt the whole year: Prosper Alpinus asserts the same; and Mr Loten, late governor of Ceylon, assured us, that those of Java never remove. These excepted, every other known kind observe a periodical migration, or retreat. The swallows of the cold Norway, and of North America, of the distant Kamtschatka, of the temperate parts of Europe, of Aleppo, and of the hot Jamaica, all agree in this one point.

"In cold countries, a defect of insect-food on the approach of winter, is a sufficient reason for these birds to quit them: but since the same cause probably does not subsist in the warm climates, recourse should be had to some other reason for their vanishing.

"Of the three opinions, the first has the utmost appearance of probability; which is, that they remove nearer the sun, where they can find a continuance of their natural diet, and a temperature of air suiting their constitutions. That this is the case with some species of European swallows, has been proved beyond contradiction (as above cited) by M. Adanson. We often observe them collected in flocks innumerable on churches, on rocks, and on trees, previous to their departure: hence and Mr Collinson proves their return here in perhaps equal numbers, by two curious relations of undoubted credit; the one communicated to him by Mr Wright, master of a ship; the other by the

Hirundo.

the late Sir Charles Wager; who both described (to the same purpose) what happened to each in their voyages. "Returning home, (says Sir Charles), in the spring of the year, as I came into founding in our channel, a great flock of swallows came and settled on all my rigging; every rope was covered; they hung on one another like a swarm of bees; the decks and carving were filled with them. They seemed almost famished and spent, and were only feathers and bones; but, being recruited with a night's rest, took their flight in the morning." This vast fatigue proves that their journey must have been very great, considering the amazing swiftness of these birds: in all probability they had crossed the Atlantic ocean, and were returning from the shores of Senegal, or other parts of Africa; so that this account from that most able and honest seaman, confirms the later information of M. Adanson.

"Mr White, on Michaelmas day 1768, had the good fortune to have ocular proof of what may reasonably be supposed an actual migration of swallows. Travelling the morning very early between his house and the coast, at the beginning of his journey he was environed with a thick fog; but on a large wild heath the mist began to break, and discovered to him numberless swallows, clustered on the standing bushes, as if they had roosted there: as soon as the sun burst out, they were instantly on wing, and with an easy and placid flight proceeded towards the sea. After this he saw no more flocks, only now and then a straggler.

In Kalm's voyage to America, is a remarkable instance of the distant flight of swallows; for one lighted on the ship he was in, September 2d, when he had passed over only two thirds of the Atlantic ocean. His passage was uncommonly quick, being performed from Deal to Philadelphia in less than six weeks; and when this accident happened, he was fourteen days sail from Cape Hinlopen.

"This rendezvous of swallows about the same time of year is very common on the willows, in the little isles in the Thames. They seem to assemble for the same purpose as those in Hampshire, notwithstanding no one yet has been eye-witness of their departure. On the 26th of September 1775, two gentlemen who happened to lie at Maidenhead Bridge, furnished at least a proof of the multitudes there assembled: they went by torch-light to an adjacent isle, and in less than half an hour brought ashore fifty dozen; for they had nothing more to do than to draw the willow-twigs through their hands, the birds never stirring till they were taken.

"The northern naturalists will perhaps say, that this assembly met for the purpose of plunging into their subaqueous winter-quarters: but were that the case, they would never escape discovery in a river perpetually fished as the Thames, as some of them must inevitably be brought up in the nets that harrahs that water.

"The second notion has great antiquity on its side. Aristotle and Pliny give it as their belief, that swallows do not remove very far from their summer habitation, but winter in the hollows of rocks, and during that time lose their feathers. The former part of their opinion has been adopted by several ingenious men; and of late, several proofs have been brought of some

Hirundo.

species, at least, having been discovered in a torpid state. Mr Collinson favoured us with the evidence of three gentlemen, eye-witnesses to numbers of sand martins being drawn out of a cliff on the Rhine, in the month of March 1762. And the honourable Daines Barrington communicated to us the following fact, on the authority of the late lord Belhaven, That numbers of swallows have been found in old dry walls, and in sand-hills near his Lordship's seat in East Lothian; not once only, but from year to year; and that when they were exposed to the warmth of a fire, they revived. We have also heard of the same annual discoveries near Morpeth, in Northumberland, but cannot speak of them with the same assurance as the two former: neither in the two last instances are we certain of the particular species.

"Other witnesses crowd on us to prove the residence of those birds in a torpid state during the severe season.

"First, In the chalky cliffs of Sussex; as was seen on the fall of great fragment some years ago.

"Secondly, In a decayed hollow tree that was cut down, near Dolgell, in Merionethshire.

"Thirdly, In a cliff near Whitby, Yorkshire; where, on digging out a fox, whole bushels of swallows were found in a torpid condition. And,

"Lastly, the reverend Mr Conway, of Sychton, Flintshire, was so obliging as to communicate the following fact: A few years ago, on looking down an old lead-mine in that county, he observed numbers of swallows clinging to the timbers of the shaft, seemingly asleep; and on flinging some gravel on them, they just moved, but never attempted to fly or change their place: this was between All Saints and Christmas.

"These are doubtless the lurking places of the later hatches, or of those young birds, who are incapable of distant migrations. There they continue insensible and rigid; but like flies may sometimes be reanimated by an unseasonable hot day in the midst of winter: for very near Christmas a few appeared on the moulding of a window of Merton college, Oxford, in a remarkably warm nook, which prematurely set their blood in motion, having the same effect as laying them before the fire at the same time of year. Others have been known to make this premature appearance; but as soon as the cold natural to the season returns, they withdraw again to their former retreats.

"I shall conclude with one argument drawn from the very late hatches of two species.

"On the 23d of October 1767, a martin was seen in Southwark, flying in and out of his nest: and on the 29th of the same month, four or five swallows were observed hovering round and settling on the county hospital at Oxford. As these birds must have been of a late hatch, it is highly improbable that at so late a season of the year, they would attempt, from one of our midland counties, a voyage almost as far as the equator to Senegal or Goree: we are therefore confirmed in our notion, that there is only a partial migration of these birds; and that the feeble late hatches conceal themselves in this country.

"The above are circumstances we cannot but assent to, though seemingly contradictory to the common course of nature in regard to other birds. We

must, therefore, divide our belief relating to these two so different opinions; and conclude, that one part of the swallow-tribe migrate, and that others have their winter-quarters near home. If it should be demanded, why swallows alone are found in a torpid state, and not the other many species of soft-billed birds, which likewise disappear about the same time? the following reason may be assigned:

“No birds are so much on the wing as swallows, none fly with such swiftness and rapidity, none are obliged to such sudden and various evolutions in their flight, none are at such pains to take their prey, and, we may add, none exert their voice more incessantly: all these occasion a vast expence of strength and of spirits, and may give such a texture to the blood as other animals cannot experience; and so dispose, or we may say necessitate, this tribe of birds, or part of them at least, to a repose more lasting than that of any others.

“The third notion is, even at first sight, too amazing and unnatural to merit mention, if it was not that some of the learned have been credulous enough to deliver for fact, what has the strongest appearance of impossibility; we mean the relation of swallows passing the winter immersed under ice, at the bottom of lakes, or lodged beneath the water of the sea at the foot of rocks. The first who broached this opinion, was Olaus Magnus, archbishop of Upsal, who very gravely informs us, that these birds are often found in clustered masses at the bottom of the northern lakes, mouth to mouth, wing to wing, foot to foot; and that they creep down the reeds in autumn, to their subaqueous retreats: That when old fishermen discover such a mass, they throw it into the water again; but when young inexperienced ones take it, they will, by thawing the birds at a fire, bring them indeed to the use of their wings, which will continue but a very short time, being owing to a premature and forced revival.

“That the good archbishop did not want credulity in other instances, appears from this, that after having stocked the bottoms of the lakes with birds, he stores the clouds with mice, which sometimes fall in plentiful showers on Norway and the neighbouring countries.

“Some of our own countrymen have given credit to the submersion of swallows; and Klein patronises the doctrine strongly, giving the following history of their manner of retreating, which he received from some countrymen and others. They asserted, that sometimes the swallows assembled in numbers on a reed, till it broke and sunk with them to the bottom; and their immersion was preceded by a dirge of a quarter of an hour's length: That others would unite in laying hold of a straw with their bills, and so plunge down in society. Others again would form a large mass, by clinging together with their feet, and so commit themselves to the deep.

“Such are the relations given by those that are fond of this opinion; and though delivered without exaggeration, must provoke a smile. They assign not the smallest reason to account for these birds being able to endure so long a submersion without being suffocated, or without decaying, in an element so unnatural to so delicate a bird; when we know that the

otter, the corvorant, and the grebes, soon perish, if caught under ice, or entangled in nets: and it is well known, that those animals will continue much longer under water than any others to whom nature hath denied that particular structure of heart necessary for a long residence beneath that element. Though entirely satisfied in our own mind of the impossibility of these relations; yet, desirous of strengthening our opinion with some better authority, we applied to that able anatomist, Mr John Hunter; who was so obliging as to inform us, that he had dissected many swallows, but found nothing in them different from other birds as to the organs of respiration: That all those animals which he had dissected of the class that sleep during winter, such as lizards, frogs, &c. had a very different conformation as to those organs: That all these animals, he believes, do breathe in their torpid state; and, as far as his experience reaches, he knows they do: and that therefore he esteems it a very wild opinion, that terrestrial animals can remain any long time under water without drowning.”

To this reasoning of Mr Pennant's, however, the following answer hath appeared in Kalm's travels in North America.—“It has been a subject of contest among naturalists, to determine the winter-retreat of swallows. Some think they go to warmer climates when they disappear in the northern countries: others say, they creep into hollow trees, and holes in clefts of rocks, and lie there all the winter in a torpid state; and others affirm, that they make their retreat into water, and revive again in spring. The two first opinions have been proved, and it seems have found credit; the last has been treated as ridiculous, and almost as an old woman's tale. Natural history, as all other histories, depends not always upon the intrinsic degree of probability, but upon facts founded on the testimony of people of noted veracity.—Swallows are seldom seen sinking down into the water; swallows have not such organs as frogs or lizards, which are torpid during winter; *ergo*, swallows live not, and cannot live, under water.—This way of arguing, I believe, would carry us, in a great many cases, too far; for, though it is not clear to every one, it may however be true; and lizards and frogs are animals of a class widely different from that of birds, and must therefore of course have a different structure; hence it is they are classed separately. The bear and the marmot are in winter in a torpid state, and have however not such organs as lizards and frogs; and nobody doubts of their being, during some time, in the most rigid climates, in a torpid state: for the Alpine nations hunt the marmots frequently, by digging their holes up; and find them so torpid, that they cut their throats, without their reviving or giving the least sign of life during the operation; but when the torpid marmot is brought into a warm room, and placed before the fire, it revives from its lethargy. The question must therefore be decided by facts; nor are these wanting here. Dr Wallerius, the celebrated Swedish chemist, informs us, That he has seen, more than once, swallows assembling on a reed, till they were all immersed and went to the bottom; this being preceded by a dirge of a quarter of an hour's length. He attests likewise, that he had seen a swallow caught during winter out of a lake with a net, drawn, as is com-

Hirundo,

common in northern countries, under the ice; this bird was brought into a warm room, revived, fluttered about, and soon after died.

"Mr Klein applied to many fermiers generaux of the king of Prussia's domains, who had great lakes in their districts, the fishery in them being a part of the revenue. In winter the fishery thereon is the most considerable under the ice, with nets spreading more than 200 or 300 fathoms, and they are often wound by screws and engines on account of their weight. All the people questioned made affidavits upon oath before the magistrates. First, The mother of the countess Lehnendorf said, that she had seen a bundle of swallows brought from the Frith-Haff, (a lake communicating with the Baltic at Pillaw), which, when brought into a moderately warm room, revived and fluttered about. Secondly, Count Schilleben gave an instrument on stamped paper, importing, that by fishing on the lake belonging to his estate of Gerdauen in winter, he saw several swallows caught in the net, one of which he took up with his hand, brought it into a warm room, where it lay about an hour, when it began to stir, and half an hour after it flew about the room. Thirdly, Fermier-general (Amtman) Witkouski made affidavit, that, in the year 1740, three swallows were brought up with the net in the great pond at Didlacken; in the year 1741, he got two swallows from another part of the pond, and took them home (they being all caught in his presence;) after an hour's space they revived all in a warm room, fluttered about, and died in three hours after. Fourthly, Amtman Bönke says, that having had the estate Kleskow in farm, he had seen nine swallows brought up in the net from under the ice, all which he took into a warm room, where he distinctly observed how they gradually revived; but a few hours after they all died. Another time his people got likewise some swallows in a net, but he ordered them to be again thrown into the water. Fifthly, Andrew Rutta, a master fisherman at Oletsko, made affidavit, in 1747, that 22 years ago, two swallows were taken up by him in a net, under the ice, and, being brought into a warm room, they flew about.—Sixthly, Jacob Kosulso, a master fisherman at Stradauen, made affidavit, that, in 1736, he brought up in winter, in a net, from under the ice of the lake at Ralki, a seemingly dead swallow, which revived in half an hour's time in warm room, and he saw, in a quarter of an hour after, the bird grow weaker, and soon after dying. Seventhly, I can reckon myself among the eye-witnesses of this paradoxon of natural history. In the year 1735, being a little boy, I saw several swallows brought in winter by fishermen, from the river Vitula, to my father's house; where two of them were brought into a warm room, revived, and flew about. I saw them several times settling on the warm stove (which the northern nations have in their rooms); and I recollect well, that the same forenoon they died, and I had them, when dead, in my hand. In the year 1754, after the death of my uncle Godefroy Wolf, captain in the Polish regiment of foot-guards; being myself one of his heirs, I administered for my co-heirs, several estates called the *Starosty of Dischau*, in Polish Prussia, which my late uncle farmed under the king. In January, the lake of Lyb-

shaw, belonging to these estates, being covered with ice, I ordered the fishermen to fish therein, and in my presence several swallows were taken, which the fishermen to fish therein, and in my presence several swallows threw in again; but one I took up to myself, brought it home, which was five miles from thence, and it revived, but died about an hour after its reviving.

"These are facts, attested by people of the highest quality, by some in public offices, and by others who, tho' of a low rank, however made these affidavits upon oath. It is impossible to suppose indifferently, that they were prompted, by views of interest, to assert as a fact, a thing which had no truth in it. It is therefore highly probable, or rather incontestably true, that swallows retire in the northern countries during winter, into the water, and stay there in a torpid state, till the return of warmth revives them again in spring. The question therefore, I believe, ought for the future to be thus stated: The swallows in Spain, Italy, France, and perhaps some from England, remove to warmer climates; some English ones, and some in Germany and other mild countries, retire into clefts and holes in rocks, and remain there in a torpid state. In the colder northern countries the swallows immerse in the sea, in lakes, and rivers; and remain in a torpid state, under ice, during winter. There are still some objections to this latter assertion, which we must remove. It is said, Why do not rapacious fish, and aquatic quadrupeds and birds, devour these swallows? The answer is obvious. Swallows choose only such places in the water for their winter-retreat, as are near reeds and rushes; so that sinking down there between them and their roots, they are by them secured against the rapaciousness of their enemies. But others object, Why are not these birds caught in such waters as are continually harried by nets? I believe the same answer which has been made to the first objection will serve for this likewise. Fishermen take care to keep off with their nets from places filled with reeds and rushes, for fear of entangling and tearing their net; and thus the situation of swallows under water, is the reason that they are seldom disturbed in their silent winter-retreats. What confirms this opinion still more is, that swallows were never caught in Prussia, according to the above-mentioned affidavits, but with those parts of the net which passed near to the reeds and rushes; and sometimes the swallows were yet fastened with their feet to a reed, when they were drawn up by the net. As to the argument taken from their being so long under water without corruption, I believe, there is a real difference between animals suffocated in water and animals being torpid therein. We have examples of things being a long time under water; to which we may add the intense cold of these northern regions, which preserves them. Who would have thought it, that snails and polypes may be dissected, and could reproduce the parts severed from their body, if it was not a fact? Natural history ought to be studied as a collection of facts, not as the history of our guesses or opinions. Nature varies in an infinite manner; and Providence has diversified the instinct of animals and their economy, and adapted it to the various seasons and climates."

HISPANIOLA, called also *St Domingo*, the

20 U 2 largest.

Hirundo,
hispaniola.

Hispaniola. largest of the Antilles or Caribbee islands, extending about 420 miles from east to west, and 120 in breadth from north to south; lying between $17^{\circ} 37'$ and 20° of N. Lat. and between $67^{\circ} 35'$ and $74^{\circ} 15'$ W. Long. The climate here hot, but not reckoned unwholesome; and some of the inhabitants are said to arrive at the age of 120. It is sometimes refreshed by breezes and rains; and its salubrity is likewise in a great measure owing to the beautiful variety of hills and valleys, woods and rivers, which every where present themselves. It is indeed reckoned by far the finest and most pleasant island of the Antilles, as being the best accommodated to all the purposes of life when duly cultivated.

This island, famous for being the earliest settlement of the Spaniards in the new world, was at first in high estimation for the quantity of gold it supplied: this wealth diminished with the inhabitants of the country, whom they obliged to dig it out of the bowels of the earth; and the source of it was entirely dried up, when they were exterminated, which was quickly done, by a series of the most shocking barbarities that ever disgraced the history of any nation. Benzoni relates, that of two millions of inhabitants, contained in the island when discovered by Columbus in 1492, scarce 153 were alive in 1545. A vehement desire of opening again this source of wealth inspired the thought of getting slaves from Africa; but, besides that these were found unfit for the labours they were destined to, the multitude of mines, which then began to be wrought on the continent, made those of Hispaniola no longer of any importance. An idea now suggested itself, that their negroes, which were healthy, strong, and patient, might be usefully employed in husbandry; and they adopted, through necessity, a wise resolution, which, had they known their own interest, they would have embraced by choice.

The produce of their industry was at first extremely small, because the labourers were few. Charles V. who, like most sovereigns, preferred his favourites to every thing, had granted an exclusive right of the slave-trade to a Flemish nobleman, who made over his privilege to the Genoese. Those avaricious republicans conducted this infamous commerce as all monopolies are conducted; they resolved to sell dear, and they sold but few. When time and competition had fixed the natural and necessary price of slaves, the number of them increased. It may easily be imagined, that the Spaniards, who had been accustomed to treat the Indians as beasts, did not entertain a higher opinion of these negro Africans, whom they substituted in their place. Degraded still further in their eyes by the price they had paid for them, even religion could not restrain them from aggravating the weight of their servitude. It became intolerable, and these wretched slaves made an effort to recover the unalienable rights of mankind. Their attempt proved unsuccessful; but they reaped this benefit from their despair, that they were afterwards treated with less inhumanity.

This moderation (if tyranny cramped by the apprehension of revolt can deserve that name) was attended with good consequences. Cultivation was pursued with some degree of success. Soon after the middle of the 16th century, the mother-country drew

annually from this colony ten million weight of sugar, *Hispaniola.* a large quantity of wood for dyeing, tobacco, cocoa, cassia, ginger, cotton, and peltry in abundance. One might imagine, that such favourable beginnings would give both the desire and the means of carrying them further; but a train of events, more fatal each than the other, ruined these hopes.

The first misfortune arose from the depopulation of the island. The Spanish conquests on the continent should naturally have contributed to promote the success of an island, which nature seemed to have formed to be the centre of that vast dominion arising around it, to be the staple of the different colonies. But it fell out quite otherwise: on a view of the immense fortunes raising in Mexico, and other parts, the richest inhabitants of Hispaniola began to despise their settlements, and quitted the true source of riches, which is on the surface of the earth, to go and ransack the bowels of it for veins of gold, which are quickly exhausted. The government endeavoured in vain to put a stop to this emigration; the laws were always either artfully eluded, or openly violated.

The weakness, which was a necessary consequence of such a conduct, leaving the coasts without defence, encouraged the enemies of Spain to ravage them. Even the capital of this island was taken and pillaged by that celebrated English sailor, Sir Francis Drake. The cruizers of less consequence contented themselves with intercepting vessels in their passage through those latitudes, the best known at that time of any in the new world. To complete these misfortunes, the Castilians themselves commenced pirates. They attacked no ships but those of their own nation; which were more rich, worse provided, and worse defended, than any others. The custom they had of fitting out ships clandestinely, in order to procure slaves, prevented them from being known; and the assistance they purchased from the ships of war, commissioned to protect the trade, insured to them impunity.

The foreign trade of the colony was its only resource in this distress; and that was illicit: but as it continued to be carried on, notwithstanding the vigilance of the governors, or, perhaps, by their connivance, the policy of an exasperated and short-sighted court exerted itself in demolishing most of the sea-ports, and driving the miserable inhabitants into the inland country. This act of violence threw them into a state of dejection; which the incursons and settlement of the French on the island afterwards carried to the utmost pitch. The latter, after having made some unsuccessful attempts to settle on the island, had part of it yielded to them in 1697, and now enjoy by far the best share.

Spain, totally taken up with that vast empire which she had formed on the continent, used no pains to dissipate this lethargy. She even refused to listen to the solicitations of her Flemish subjects, who earnestly pressed that they might have permission to clear those fertile lands. Rather than run the risk of seeing them carry on a contraband trade on the coasts, she chose to bury in oblivion a settlement which had been of consequence, and was likely to become so again.

This colony, which had no longer any intercourse with the mother-country but by a single ship, of no great burthen, that arrived from thence every third year, consisted

confisted, in 1717, of 18410 inhabitants, including Spaniards, Mestees, Negroes, or Mulattoes. The complexion and character of these people differed according to the different proportions of American, European, and African blood they had received from that natural and transient union which restores all races and conditions to the same level. These demi-savages, plunged in the extreme of sloth, lived upon fruits and roots, dwelt in cottages without furniture, and most of them without clothes. The few among them, in whom indolence had not totally suppressed the sense of decency, and taste for the conveniences of life, purchased clothes

of their neighbours the French, in return for their cattle, and the money sent to them for the maintenance of two hundred soldiers, the priests, and the government. It does not appear that the company, formed at Barcelona in 1757, with exclusive privileges for the re-establishment of St Domingo, hath as yet made any considerable progress. They send out only two small vessels annually, which are freighted back with six thousand hides, and some other commodities of little value. See ST DOMINGO.

HISTORIOGRAPHER, a professed historian, or writer of history.

H I S T O R Y.

HISTORY, in general, signifies an account of some remarkable facts which have happened in the world, arranged in the true order in which they actually took place, together with the causes to which they were owing, and the different effects they have produced, as far as can be discovered.—The word is Greek, *ἱστορία*; and literally denotes a search of curious things, or a desire of knowing, or even a rehearsal of things we have seen; being formed from the verb *ἵστωρ*, which properly signifies to know a thing by having seen it. But the idea is now much more extensive, and is applied to the knowledge of things taken from the report of others. The origin is from the verb *ἵστωρ*, “I know;” and hence it is, that among the ancients several of their great men were called *polyhistores*, i. e. persons of various and general knowledge.

Sometimes, however, the word history is used to signify a description of things, as well as an account of facts. Thus Theophrastus calls his work, in which he has treated of the nature and properties of plants, an *history of plants*; and we have a treatise of Aristotle, intitled an *history of animals*; and to this day the descriptions of plants, animals, and minerals, are called by the general name of *natural history*.

But what chiefly merits the name of history, and what is here considered as such, is an account of the principal transactions of mankind since the beginning of the world; and which naturally divides itself into two parts, namely, *civil* and *ecclesiastical*. The first contains the history of mankind in their various relations to one another, and their behaviour, for their own emolument, or that of others, in common life; the second considers them as acting, or pretending to act, in obedience to what they believe to be the will of the Supreme Being.—Civil history, therefore, includes an account of all the different states that have existed in the world, and likewise of those men who in different ages of the world have most eminently distinguished themselves either for their good or evil actions. This last part of civil history is usually termed BIOGRAPHY.

History is now considered as a very considerable branch of polite literature: few accomplishments are more valued than an accurate knowledge of the histories of different nations; and scarce any literary production is more regarded than a well-written history of any nation.

With regard to the study of history, we must consider, that all the revolutions which have happened in

the world, have been owing to two causes. 1. The connections between the different states existing together in the world at the same time, or their different situations with regard to one another; and, 2. The different characters of the people who in all ages constituted these states, their different geniuses and dispositions, &c. by which they were either prompted to undertake such and such actions of themselves, or were easily induced to it by others. The person who would study history, therefore, ought in the first place to make himself acquainted with the state of the world in general in all different ages; what nations inhabited the different parts of it; what their extent of territory was; at what particular time they arose, and when they declined. He is then to inform himself of the various events which have happened to each particular nation; and, in so doing, he will discover many of the causes of those revolutions, which before he only knew as facts. Thus, for instance, a person may know the Roman history from the time of Romulus, without knowing in the least why the city of Rome happened to be built at that time. This cannot be understood without a particular knowledge of the former state of Italy, and even of Greece and Asia; seeing the origin of the Romans is commonly traced as high as Æneas, one of the heroes of Troy. But when all this is done, which indeed requires no small labour, the historian hath yet to study the genius and dispositions of the different nations, the characters of those who were the principal directors of their actions, whether kings, ministers, generals, or priests; and when this is accomplished, he will discover the causes of those transactions in the different nations which have given rise to the great revolutions above mentioned: after which, he may assume the character of one who is perfectly versed in history.

The first outline of history, as it may be called, is most easily obtained by the inspection of an historical chart; and that subjoined to the present treatise, will answer the purpose as well as any. Along with this it will be proper to peruse a short abridgment of general history, from the creation of the world to the present time; but in this way there have been but very few attempts attended with any tolerable success. The following is collected from respectable authorities, and may serve to help the ideas of the reader on this subject.

SECT. I. *Civil History.*3
Civil
history how
divided.

HISTORY, tho' seemingly incapable of any natural division, will yet be found, on a nearer inspection, to resolve itself into the following periods, at each of which a great revolution took place, either with regard to the whole world, or a very considerable part of it. 1. The creation of man. 2. The flood. 3. The beginning of profane history, *i. e.* when all the fabulous relations of heroes, demi-gods, &c. were expelled from historical narrations, and men began to relate facts with some regard to truth and credibility. 4. The conquest of Babylon by Cyrus, and the destruction of the Babylonian empire. 5. The reign of Alexander the Great, and the overthrow of the Persian empire. 6. The destruction of Carthage by the Romans, when the latter had no longer any rival capable of opposing their designs. 7. The reign of the emperor Trajan, when the Roman empire was brought to its utmost extent. 8. The division of the empire under Constantine. 9. The destruction of the Western empire by the Herali, and the settlement of the different European nations. 10. The rise of Mahomet, and the conquests of the Saracens and Turks. 11. The crusades, and all the space intervening between that time and the present.

4
Mosaic ac-
count of the
creation
the only
probable
one.

Concerning the number of years which have elapsed since the creation of the world, there have been many disputes. The compilers of the Universal History determine it to have taken place in the year 4305 B. C. so that, according to them, the world is now in the 6085th year of its age. Others think it was created only 4000 years B. C. so that it hath not yet attained its 6000th year. Be this as it will, however, the whole account of the creation rests on the truth of the Mosaic history; and which we must of necessity accept, because we can find no other which does not either abound with the grossest absurdities, or lead us into absolute darkness. The Chinese and Egyptian pretensions to antiquity are so absurd and ridiculous, that the bare reading must be a sufficient confutation of them to every reasonable person. See the articles CHINA and EGYPT. Some historians and philosophers are inclined to discredit the Mosaic accounts, from the appearances of volcanoes, and other natural phenomena: but their objections are by no means sufficient to invalidate the authority of the sacred writings; not to mention that every one of their own systems is liable to insuperable objections. See the article EARTH. It is therefore reasonable for every person to accept of the Mosaic account of the creation as truth: but an historian is under an absolute necessity of doing it, because, without it, he is quite destitute of any standard or scale by which he might reduce the chronology of different nations to any agreement; and, in short, without receiving this account as true, it would be in a manner impossible at this day to write a general history of the world.

5
History
from the
creation to
the flood.

1. The transactions during the first period, viz. from the creation to the flood, are very much unknown, nothing indeed being recorded of them but what is to be found in the first six chapters of Genesis. In general, we know, that men were not at that time in a savage state; they had made some progress in the arts, had invented music, and found out the method of working

metals. They seem also to have lived in one vast community, without any of these divisions into different nations which have since taken place, and which evidently proceeded from the confusion of languages. The most material part of their history, however, is, that having once begun to transgress the divine commands, they proceeded to greater and greater lengths of wickedness, till at last the Deity thought proper to send a flood on the earth, which destroyed the whole human race except eight persons, viz. Noah and his family. This terrible catastrophe happened, according to the Hebrew copy of the Bible, 1656 years after the creation; according to the Samaritan copy, 1307. For the different conjectures concerning the natural causes of the flood, see the article DELUGE.

2. For the history of the second period we must again have recourse to the Scriptures, almost as much as for that of the first. We now find the human race reduced to eight persons possessed of nothing but what they had saved in the ark, and the whole world to be stored with animals from those which had been preserved along with these eight persons. In what country their original settlement was, no mention is made. The ark is supposed to have rested on Mount Ararat in Armenia*; but it is impossible to know whether Noah and his sons made any stay in the neighbourhood of this mountain or not. Certain it is, that, some time after, the whole or the greatest part of the human race were assembled in Babylonia, where they engaged in building a tower. This gave offence to the Deity; so that he punished them by confounding their language; whence the division of mankind into different nations.

6
From the
flood to the
beginning of
profane
history.• See
Ararat.

According to a common opinion, Noah when dying left the whole world to his sons, giving Asia to Shem, Africa to Ham, and Europe to Japhet. But this hath not the least foundation in Scripture. By the most probable accounts, Gomer the son of Japhet was the father of the Gomerians or Celtes; that is, all the barbarous nations who inhabited the northern parts of Europe under the various names of *Gauls, Cimbrians, Goths*, &c. and who also migrated into Spain, where they were called *Celtiberians*. From Magog, Meshech, and Tubal, three of Gomer's brethren, proceeded the Scythians, Sarmatians, Tartars, and Moguls. The three other sons of Japhet, Madai, Javan, and Tiras, are said to have been the fathers of the Medes, the Ionians, Greeks, and Thracians.

7
Nations de-
scended
from Ja-
phet.

The children of Shem were Elam, Ashur, Arphaxad, Lud, and Aram. The first settled in Persia, where he was the father of that mighty nation: The descendants of Ashur peopled Assyria, (now *Curdeslan*): Arphaxad settled in Chaldaea. Lud is supposed by Josephus to have taken up his residence in Lydia; though this is much controverted. Aram, with more certainty, is thought to have settled in Mesopotamia and Syria.

8
From Shem

The children of Ham were Cush, Mizraim, Phut, Canaan. The first is thought to have remained in Babylonia, and to have been king of the south-eastern parts of it afterwards called *Khuzestan*. His descendants are supposed to have removed into the eastern parts of Arabia; from whence they by degrees migrated into the corresponding part of Africa. The second peopled Egypt, Ethiopia, Cyrenaica, Libya, and

9
From Ham.

Civil
History.

and the rest of the northern parts of the same continent. The place where Phut settled is not known: but Canaan is universally allowed to have settled in Phœnicia; and to have founded those nations who inhabited Judea, and were afterwards exterminated by the Jews.

Almost all the countries of the world, at least of the eastern continent, being thus furnished with inhabitants, it is probable that for many years there would be few or no quarrels between the different nations. The paucity of their numbers, their distance from one another, and their diversity of language, would contribute to keep them from having much communication with each other. Hence, according to the different circumstances in which the different tribes were placed, some would be more civilized, and others more barbarous. In this interval, also, the different nations probably acquired different characters, which afterwards they obstinately retained, and manifested on all occasions; hence the propensity of some nations to monarchy, as the Asiatics, and the enthusiastic desire of the Greeks for liberty and republicanism, &c.

10
Foundation of the kingdoms of Babylonia, Assyria, &c.

The beginning of monarchical government was very early; Nimrod, the son of Cush, having found means to make himself king of Babylonia. In a short time Ashur emigrated from the new kingdom; built Nineveh, afterwards capital of the Assyrian empire; and two other cities called *Rezen* and *Rehoboth*, concerning the situation of which we are now much in the dark. Whether Ashur at this time set up as a king for himself, or whether he held these cities as vassal to Nimrod, is now unknown. It is probable, however, that about the same time various kingdoms were founded in different parts of the world; and which were great or small, according to different circumstances. Thus the scripture mentions the kings of Egypt, Gerar, Sodom, Gomorrah, &c. in the time of Abraham; and we may reasonably suppose, that these kings reigned over nations which had existed for some considerable time before.

11
Migration of the Israelites from Egypt

The first considerable revolution we read of is the migration of the Israelites out of Egypt, and their establishment in the land of Canaan. For the history of these transactions we must refer to the Old Testament, where the reader will see that it was attended with the most terrible catastrophe to the Egyptians, and with the utter extermination of some nations, the descendants of Ham, who inhabited Judea. Whether the overthrow of Pharaoh in the Red Sea could affect the Egyptian nation in such a manner as to deprive them of the greatest part of their former learning, and to keep them for some ages after in a barbarous state, is not easily determined; but unless this was the case, it seems exceedingly difficult to account for the total silence of their records concerning such a remarkable event, and indeed for the general confusion and uncertainty in which the early history of Egypt is involved. The settlement of the Jews in the promised land of Canaan is supposed to have happened about 1491 B. C.

12
History of the Greeks.

For near 200 years after this period, we find no accounts of any other nations than those mentioned in scripture. About 1280 B. C. the Greeks began to make other nations feel the effects of that enterprising and martial spirit for which they were so remarkable, and which they had undoubtedly exercised upon one

another long before. Their first enterprise was an invasion of Colchis (now *Mingrelia*), for the sake of the golden fleece. Whatever was the nature of this expedition, it is probable they succeeded in it; and it is likewise probable, that it was this specimen of the riches of Asia which inclined them so much to Asiatic expeditions ever after. All this time we are totally in the dark about the state of Asia and Africa, except in so far as can be conjectured from Scripture. The ancient empires of Babylon, Assyria, and Persia, probably still continued in the former continent, and Egypt and Ethiopia seem to have been considerable kingdoms in the latter.

About 1184 years B. C. the Greeks again distinguished themselves by their expedition against Troy, a city of Phrygia Minor; which they plundered and burnt, massacring the inhabitants with the most unrelenting cruelty. *Æneas*, a Trojan prince, escaped with some followers into Italy, where he became the remote founder of the Roman empire. At this time Greece was divided into a number of small principalities, most of which seem to have been in subjection to Agamemnon king of Mycenæ. In the reign of Atreus, the father of this Agamemnon, the Heraclidae, or descendants of Hercules, who had been formerly banished by Euristheus, were again obliged to leave this country. Under their champion Hyllus, they claimed the kingdom of Mycenæ as their right, pretending that it belonged to their great ancestor Hercules, who was unjustly deprived of it by Euristheus *. The controversy was decided by single combat; but Hyllus being killed, they departed as had been before agreed, under a promise of not making any attempt to return for 50 years. About the time of the Trojan war also, we find the Lydians, Mysians, and some other nations of Asia Minor, first mentioned in history. The names of the Greek states mentioned during this uncertain period are, 1. Sicyon. 2. Leleg. 3. Messina. 4. Athens. 5. Crete. 6. Argos. 7. Sparta. 8. Pelasgia. 9. Theffaly. 10. Attica. 11. Phocis. 12. Locris. 13. Ozela. 14. Corinth. 15. Eleusina. 16. Elis. 17. Pilus. 18. Arcadia. 19. Egina. 20. Ithaca. 21. Cephalone. 22. Phthia. 23. Phocidia. 24. Ephyra. 25. Eolia. 26. Thebes. 27. Calista. 28. Etolia. 29. Doloppa. 30. Oechalia. 31. Mycenæ. 32. Eubœa. 33. Mynia. 34. Doris. 35. Phera. 36. Iola. 37. Trachina. 38. Thraprocia. 39. Myrmidonia. 40. Salamine. 41. Scyros. 42. Hypæria or Melite. 43. The Vulcanian isles. 44. Megara. 45. Epirus. 46. Achaia. 47. The isles of the Egean Sea. Concerning many of these, we know nothing besides their names; the most remarkable particulars concerning the rest may be found under their respective articles.

* See
Hercules.

About 1048 B. C. the kingdom of Judea under king David approached its utmost extent of power. In its most flourishing condition, however, it never was remarkable for the largeness of its territory. In this respect it scarce exceeded the kingdom of Scotland; though, according to the accounts given in Scripture, the magnificence of Solomon was superior to that of the most potent monarchs on earth. This extraordinary wealth was owing partly to the spoils amassed by king David in his conquests over his various enemies, and partly to the commerce with the East Indies which

13
Of the
Jews.

which Solomon had established. Of this commerce he owed his share to the friendship of Hiram king of Tyre, a city of Phœnicia, whose inhabitants were now the most famed for commerce and skill in maritime affairs of any in the whole world.

After the death of Solomon, which happened about 975 B. C. the Jewish empire began to decline, and soon after many powerful states arose in different parts of the world. The disposition of mankind in general seems now to have taken a new turn, not easily accounted for. In former times, whatever wars might have taken place between neighbouring nations, we have no account of any extensive empire in the whole world, or that any prince undertook to reduce far distant nations to his subjection. The empire of Egypt indeed is said to have been extended immensely to the east, even before the days of Sesostris. Of this country, however, our accounts are so imperfect, that scarce any thing can be concluded from them. But now, as it were all at once, we find almost every nation aiming at universal monarchy, and refusing to set any bounds whatever to its ambition. The first shock given to the Jewish grandeur was the division of the kingdom into two through the imprudence of Rehoboam: This rendered it more easily a prey to Shishak king of Egypt; who five years after came and pillaged Jerusalem, and all the fortified cities of the kingdom of Judah. The commerce to the East Indies was now discontinued, and consequently the sources of wealth in a great measure stopped; and this, added to the perpetual wars between the kings of Israel and Judah, contributed to that remarkable and speedy decline which is now so easily to be observed in the Jewish affairs.

Whether this king Shishak was the Sesostris of profane writers or not, his expedition against Jerusalem as recorded in Scripture seems very much to resemble the desultory conquests ascribed to Sesostris. His infantry is said to have been innumerable, composed of different African nations; and his cavalry 60,000, with 1200 chariots; which agrees pretty well with the mighty armament ascribed to Sesostris, and of which an account is given under the article EGYPT, n° 2. There indeed his cavalry are said to have been only 24,000; but the number of his chariots are increased to 27,000; which last may not unreasonably be reckoned an exaggeration, and these supernumerary chariots may have been only cavalry: but, unless we allow Sesostris to be the same with Shishak, it seems impossible to fix on any other king of Egypt that can be supposed to have undertaken this expedition in the days of Solomon.

Though the Jews obtained a temporary deliverance from Shishak, they were quickly after attacked by new enemies. In 941 B. C. one Zerah, an Ethiopian, invaded Judæa with an army of a million of infantry and 300 chariots; but was defeated with great slaughter by Asa king of Judah, who engaged him with an army of 80,000 men. About this time also we find the Syrians grown a considerable people, and bitter enemies both to the kings of Israel and Judah; aiming in fact at the conquest of both nations. Their kingdom commenced in the days of David, under Hadadzer, whose capital was Zobah, and who probably was at last obliged to become David's tributary, after

having been defeated by him in several engagements. Before the death of David, however, one Rezon, who it seems had rebelled against Hadadzer, having found means to make himself master of Damascus, erected there a new kingdom, which soon became very powerful. The Syrian princes being thus in the neighbourhood of the two rival states of Israel and Judah (whose capitals were Samaria and Jerusalem), found it an easy matter to weaken them both, by pretending to assist the one against the other; but a detail of the transactions between the Jews and Syrians is only to be found in the Old Testament, to which we refer. In 740 B. C. however, the Syrian empire was totally destroyed by Tiglath Pileser king of Assyria; as was also the kingdom of Samaria by Shalmaneser his successor, in 721. The people were either massacred, or carried into captivity into Media, Persia, and the countries about the Caspian sea.

While the nations of the east were thus destroying each other, the foundations of very formidable empires were laid in the west, which in process of time were to swallow up almost all the eastern ones. In Africa, Carthage was founded by a Tyrian colony, about 869 B. C. according to those who ascribe the highest antiquity to that city; but, according to others, it was founded only in 769 or 770 B. C. In Europe a very considerable revolution took place about 900 B. C. The Heraclidae, whom we have formerly seen expelled from Greece by Atreus the father of Agamemnon, after several unsuccessful attempts, at last conquered the whole Peloponnesus. From this time the Grecian states became more civilized, and their history becomes less obscure. The institution, or rather the revival and continuance, of the Olympic games, in 776 B. C. also greatly facilitated the writing not only of their history, but that of other nations; for as each Olympiad consisted of four years, the chronology of every important event became indubitably fixed by referring it to such and such an Olympiad. In 748 B. C. or the last year of the seventh Olympiad, the foundations of the city of Rome were laid by Romulus; and, 43 years after, the Spartan state was new modelled, and received from Lycurgus those laws, by observing of which it afterwards arrived at such a pitch of splendor.

3. With the beginning of the 28th Olympiad, or 568 B. C. commences the third general period above mentioned, when profane history becomes somewhat more clear, and the relations concerning the different nations may be depended upon with some degree of certainty. The general state of the world was at that time as follows.—The northern parts of Europe were either thinly inhabited, or filled with unknown and barbarous nations, the ancestors of those who afterwards destroyed the Roman empire. France and Spain were inhabited by the Gomerians or Celtes. Italy was divided into a number of petty states arising partly from Gauls, and partly from Grecian colonies; among which the Romans had already become formidable. They were governed by their king Servius Tullius; had increased their city by the demolition of Alba Longa, and the removal of its inhabitants to Rome; and had enlarged their dominions by several cities taken from their neighbours. Greece was also divided into a number of small states, among

15
Of the
Western
nations.

16
State of the
world at the
beginning
of the third
general pe-
riod.

12
Of the Sy-
rians.

which the Athenians and Spartans, being the most remarkable, were rivals to each other. The former had, about 599 B. C. received an excellent legislation from Solon, and were enriching themselves by navigation and commerce: the latter were become formidable by the martial institutions of Lycurgus; and, having conquered Messina, and added its territory to their own, were justly esteemed the most powerful people in Greece. The other states of most consideration were Corinth, Thebes, Argos, and Arcadia.—In Asia great revolutions had taken place. The ancient kingdom of Assyria was destroyed by the Medes and Babylonians, its capital city Nineveh utterly ruined, and the greatest part of its inhabitants carried to Babylon. Nay, the very materials of which it was built were carried off, to adorn and give strength to that stately metropolis, which was then undoubtedly the first city in the world. Nebuchadnezzar, a wife and valiant prince, now sat on the throne of Babylon. By him the kingdom of Judæa was totally overthrown in 587 B. C. Three years before this, he had taken and razed the city of Tyre, and overrun all the kingdom of Egypt. He is even said by Josephus to have conquered Spain, and reigned there nine years, after which he abandoned it to the Carthaginians; but this seems by no means probable. The extent of the Babylonian empire is not certainly known: but, from what is recorded of it, we may conclude, that it was not at all inferior even in this respect to any that ever existed; as the Scripture tells us it was superior in wealth to any of the succeeding ones. We know that it comprehended Phœnicia, Palestine, Syria, Babylonia, Media, and Persia, and not improbably India also; and from a consideration of this vast extent of territory, and the riches with which every one of these countries abounded, we may form some idea of the wealth and power of this monarch. When we consider also, that the whole strength of this mighty empire was employed in beautifying the metropolis, we cannot look upon the wonders of that city as related by Herodotus to be at all incredible. See BABYLON; and ARCHITECTURE, n° 13. As to what passed in the republic of Carthage about this time, we are quite in the dark; there being a chasm in its history for no less than 300 years.

17
Fourth period. History of the Babylonian empire.

4. The fourth general period of history, namely, from the end of the fabulous times to the conquest of Babylon by Cyrus, is very short, including no more than 31 years. This sudden revolution was occasioned by the misconduct of Evil-merodach Nebuchadnezzar's son, even in his father's life-time. For having, in a great hunting match on occasion of his marriage, entered the country of the Medes, and some of his troops coming up at the same time to relieve the garisons in those places, he joined them to those already with him, and without the least provocation began to plunder and lay waste the neighbouring country. This produced an immediate revolt, which quickly extended over all Media and Persia. The Medes, headed by Astyages and his son Cyaxares, drove back Evil-merodach and his party with great slaughter; nor doth it appear that they were afterwards reduced even by Nebuchadnezzar himself. The new empire continued daily to gather strength, and at last Cyrus, Astyages's

Vol. V.

grandson, a prince of great prudence and valour, being made generalissimo of the Median and Persian forces, took Babylon itself, in the year 538 B. C. as related under the article BABYLON.

During this period the Romans increased in power under the wife administration of their king Servius Tullius, who, though a pacific prince, rendered his people more formidable by a peace of 20 years than his predecessors had done by all their victories. The Greeks, even at this early period, began to interfere with the Persians, on account of the Ionians or Grecian colonies in Asia Minor. These had been subdued by Cræsus king of Lydia about the year 562, the time of Nebuchadnezzar's death. Whether the Lydians had been subdued by the Babylonish monarch or not, is not now to be ascertained; though it is very probable that they were either in subjection to him, or greatly awed by his power, as before his death nothing considerable was undertaken by them. It is indeed probable, that during the infancy of Nebuchadnezzar, spoken of by Daniel, the affairs of his kingdom would fall into confusion; and many of those princes whom he formerly retained in subjection would set up for themselves. Certain it is, however, that if the Babylonians did not regard Cræsus as their subject, they looked upon him to be a very faithful ally; inasmuch that they celebrated an annual feast in commemoration of a victory obtained by him over the Scythians. After the death of Nebuchadnezzar, Cræsus subdued many nations in Asia Minor, and among the rest the Ionians, as already related. They were, however, greatly attached to his government; for though they paid him tribute, and were obliged to furnish him with some forces in time of war, they were yet free from all kind of oppression. When Cyrus therefore was proceeding in his conquests of different parts of the Babylonish empire, before he proceeded to attack the capital, the Ionians refused to submit to him, though he offered them very advantageous terms. But soon after, Cræsus himself being defeated and taken prisoner, the Ionians sent ambassadors to Cyrus, offering to submit on the terms which had formerly been proposed. These terms were now refused; and the Ionians, being determined to resist, applied to the Spartans for aid. Though the Spartans at that time could not be prevailed upon to give their countrymen any assistance, they sent ambassadors to Cyrus with a threatening message; to which he returned a contemptuous answer, and then forced the Ionians to submit at discretion, five years before the taking of Babylon. Thus commenced the hatred between the Greeks and Persians; and thus we see, that in the two first great monarchies the seeds of their destruction were sown even before the monarchies themselves were established. For while Nebuchadnezzar was raising the Babylonish empire to its utmost height, his son was destroying what his father built up; and at the very time when Cyrus was establishing the Persian monarchy, by his ill-timed severity to the Greeks he made that warlike people his enemies, whom his successors were by no means able to resist, and who would probably have overcome Cyrus himself, had they united in order to a tack him. The transactions of Africa during this period are almost entirely unknown; though we cannot

18
Of the Romans, Greeks, Lydians, and Persians.

20 X

not

19
Fifth gene-
ral pe-
riod. His-
tory of the
Jews, Ba-
bylonians,
Egyptians,
&c.

not doubt that the Carthaginians enriched themselves by means of their commerce, which enabled them afterwards to attain such a considerable share of power.

5. Cyrus having now become master of all the east, the Asiatic affairs continued for some time in a state of tranquillity. The Jews obtained leave to return to their own country, rebuild their temple, and again establish their worship, of all which an account is given in the sacred writings, though undoubtedly they must have been in a state of dependance on the Persians from that time forward. Cambyles the successor of Cyrus added Egypt to his empire, which had either not submitted to Cyrus, or revolted soon after his death. He intended also to have subdued the Carthaginians; but as the Phœnicians refused to supply him with ships to fight against their own countrymen, he was obliged to lay this design aside.

In 517 B. C. the Babylonians finding themselves grievously oppressed by their Persian masters, resolved to shake off the yoke, and set up for themselves. For this purpose, they took care to store their city with all manner of provisions; and when Darius Hytaspes, then king of Persia, advanced against them, they took the most barbarous method that can be imagined of preventing an unnecessary consumption of those provisions, which they had so carefully amassed. Having collected all the women, old men, and children, into one place, they strangled them without distinction, whether wives, fathers, mothers, brothers, or sisters; every one being allowed to save only the wife he liked best, and a maid servant to do the work of the house. This cruel policy did not avail them: their city was taken by treachery (for it was impossible to take it by force); after which the king caused the walls of it to be beat down from 200 to 50 cubits height, that their strength might no longer give encouragement to the inhabitants to revolt. Darius then turned his arms against the Scythians; but finding that expedition turn out both tedious and unprofitable, he directed his course eastward, and reduced all the country as far as the river Indus. In the mean time, the Ionians revolted; and being assisted by the Greeks, a war commenced between the two nations, which was not thoroughly extinguished but by the destruction of the Persian empire in 330 B. C. The Ionians, however, were for this time obliged to submit, after a war of six years; and were treated with great severity by the Persians. The conquest of Greece itself was then projected: but the expeditions for that purpose ended most unfortunately for the Persians, and encouraged the Greeks to make reprisals on them, in which they succeeded according to their utmost wishes; and had it only been possible for them to have agreed among themselves, the downfall of the Persian empire would have happened much sooner than it did. See ATHENS, SPARTA, MACEDON, and PERSIA.

In 459 B. C. the Egyptians made an attempt to recover their liberty, but were reduced after a war of six years. In 413 B. C. they revolted a second time: and being assisted by the Sidonians, drew upon the latter that terrible destruction foretold by the prophets; while they themselves were so thoroughly humbled, that they never after made any attempt to recover their liberty.

The year 403 B. C. proved remarkable for the revolt of Cyrus against his brother Artaxerxes Mnemon; in which, through his own rashness, he miscarried, and lost his life at the battle of Cunaxa in the province of Babylon. Ten thousand Greek mercenaries, who served in his army, made their way back into Greece, though surrounded on all sides by the enemy, and in the heart of a hostile country. In this retreat they were commanded by Xenophon, who has received the highest praises on account of his conduct and military skill in bringing it to a happy conclusion. Two years after, the invasions of Agaglaus king of Sparta threatened the Persian empire with total destruction; from which however it was relieved by his being recalled in order to defend his own country against the other Grecian states; and after this the Persian affairs continued in a more prosperous way till the time of Alexander.

During all this time, the volatile and giddy temper of the Greeks, together with their enthusiastic desire of romantic exploits, were preparing fetters for themselves, which indeed seemed to be absolutely necessary to prevent them from destroying one another. A zeal for liberty was what they all pretended; but on every occasion it appeared that this love of liberty was only a desire of dominion. No state in Greece could bear to see another equal to itself; and hence their perpetual contests for pre-eminence, which could not but weaken the whole body, and render them an easy prey to an ambitious and politic prince, who was capable of taking advantage of those divisions. Being all equally impatient of restraint they never could bear to submit to any regular government; and hence their determinations were nothing but the decisions of a mere mob, of which they had afterwards almost constantly reason to repent. Hence also their base treatment of those eminent men whom they ought most to have honoured, as Miltiades, Aristides, Themistocles, Alcibiades, Socrates, Phocion, &c. The various transactions between the Grecian states, though they make a very considerable figure in particular history, make none at all in a general sketch of the history of the world. We shall therefore only observe, that in 404 B. C. the Athenian power was in a manner totally broken by the taking of their city by the Spartans. In 370, that of the Spartans received a severe check from the Thebans at the battle of Leuctra; and, eight years after, was still further reduced by the battle of Mantinea. Epaminondas, the great enemy of the Spartans, was killed; but this only proved a more speedy means of subjugating all the states to a foreign, and at that time despicable, power. The Macedonians, a barbarous nation, lying to the north of the states of Greece, were, two years after the death of Epaminondas reduced to the lowest ebb by the Illyrians, another nation of barbarians in the neighbourhood. The king of Macedon being killed in an engagement, Philip, his brother, departed from Thebes, where he had studied the art of war under Epaminondas, in order to take possession of his kingdom. Being a man of great prudence and policy, he quickly settled his own affairs; vanquished the Illyrians; and, being no stranger to the weakened situation of Greece, began almost immediately to meditate the conquest of it. The particulars of this enterprize are related under the article MACEDON: here it is sufficient

20
Xenophon's
retreat.

21
History of
the Greeks.

ficient to take notice, that by first attacking those he was sure he could overcome, by corrupting those whom he thought it dangerous to attack, by sometimes pretending to assist one state and sometimes another, and by imposing upon all as best served his turn, he at last put it out of the power of the Greeks to make any resistance, at least such as could keep him from gaining his end. In 338 B. C. he procured himself to be elected general of the Amphictyons, or council of the Grecian states, under pretence of settling some troubles at that time in Greece; but having once obtained liberty to enter that country with an army, he quickly convinced the States that they must all submit to his will. He was opposed by the Athenians and Thebans; but the intestine wars of Greece had cut off all her great men, and no general was now to be found capable of opposing Philip with success.

The king of Macedon, being now master of all Greece, projected the conquest of Asia. To this he was encouraged by the ill success which had attended the Persians in their expeditions against Greece, the success of the Greeks in their invasions, and the retreat of the ten thousand under Xenophon. All these events shewed the weakness of the Persians, their vast inferiority to the Greeks in military skill, and how easily their empire might be overthrown by a proper union among the states.

22
Conquest of
Persia by
Alexander.

Philip was preparing to enter upon his grand design, when he was murdered by some assassins. His son Alexander was possessed of every quality necessary for the execution of so great a plan; and his impetuosity of temper made him execute it with a rapidity unheard of either before or since. It must be confessed, indeed, that the Persian empire was now ripe for destruction, and could not in all probability have withstood an enemy much less powerful than Alexander. The Asiatics have in all ages been much inferior to the European nations in valour and military skill. They were now sunk in luxury and effeminacy; and what was worse, they seem at this period to have been seized with that insatiation and distraction of counsels which scarce ever fails to be a forerunner of the destruction of any nation. The Persian ministers persuaded their sovereign to reject the prudent advice that was given him, of distressing Alexander by laying waste the country, and thus forcing him to return for want of provisions. Nay, they even prevented him from engaging the enemy in the most proper manner, by dividing his forces; and persuaded him to put Charidemus the Athenian to death, who had promised, with 100,000 men, of whom one third were mercenaries, to drive the Greeks out of Asia. In short, Alexander met with only two checks in his Persian expedition. The one was from the city of Tyre, which for seven months resisted his utmost efforts; the other was from Memnon the Rhodian, who had undertaken to invade Macedonia. The first of these obstacles Alexander at last got over, and treated the governor and inhabitants with the utmost cruelty. The other was scarce felt; for Memnon died after reducing some of the Grecian islands, and Darius had no other general capable of conducting the undertaking. The power of the Persian empire was totally broke by the victory gained over Darius at Arbela in 331 B. C. and next year a total end was put to

it by the murder of the king by Bessus one of his subjects.

The ambition of Alexander was not to be satisfied with the possession of the kingdom of Persia, or indeed of any other on earth. Nothing less than the total subjection of the world itself seemed sufficient to him; and therefore he was now prompted to invade every country of which he could only learn the name, whether it had belonged to the Persians or not. In consequence of this disposition, he invaded and reduced Hyrcania, Bactria, Sogdiana, and all that vast tract of country now called *Bukharia*. At last, having entered India, he reduced all the nations to the river Hyphasis, one of the branches of the Indus. But when he would have proceeded farther, and extended his conquests quite to the eastern extremities of Asia, his troops positively refused to follow him farther, and he was constrained to return. In 323, this mighty conqueror died of a fever; without having time to settle the affairs of his vast extended empire, or even to name his successor.

While the Grecian empire thus suddenly sprung up in the east, the rival states of Rome and Carthage were making considerable advances in the west. The Romans were establishing their empire on the most solid foundations; to which their particular situation naturally contributed. Being originally little better than a parcel of lawless banditti, they were despised and hated by the neighbouring states. This soon produced wars; in which, at first from accidental circumstances, and afterwards from their superior valour and conduct, the Romans proved almost constantly victorious. The jealousies which prevailed among the Italian states, and their ignorance of their true interest, prevented them from combining against that aspiring nation, and crushing it in its infancy, which they might easily have done; while in the mean time the Romans, being kept in a state of continual warfare, became at last such expert soldiers, that no other state on earth could resist them. During the time of their kings they had made a very considerable figure among the Italian nations; but after their expulsion, and the commencement of the republic, their conquests became much more rapid and extensive. In 501 B. C. they subdued the Sabines; eight years after, the Latins; and in 399 the city of Veii, the strongest in Italy excepting Rome itself, was taken after a siege of ten years. But in the midst of their successes a sudden irruption of the Gauls had almost put an end to their power and nation at once. The city was burnt to the ground in 383 B. C. and the capitol on the point of being surprized, when the Gauls, who were climbing up the walls in the night, were accidentally discovered and repulsed*. In a short time Rome was rebuilt with much greater splendour than before, but now a general revolt and combination of the nations formerly subdued took place. The Romans, however, still got the better of their enemies; but, even at the time of the celebrated Camillus's death, which happened about 352 B. C. their territories scarce extended six or seven leagues from the capital. The republic from the beginning was agitated by those dissensions which at last proved its ruin. The people had been divided by Romulus into two classes, namely *Patricians* and *Plébeians*, answer-

23
His conquest of other nations.

24
History of the Romans.

* See Rome.

Civil
History.

ing to our nobility and commonalty. Between these two bodies were perpetual jealousies and contentions; which retarded the progress of the Roman conquests, and revived the hopes of the nations they had conquered. The tribunes of the people were perpetually opposing the consuls and military tribunes. The senate had often recourse to a dictator endowed with absolute power; and then the valour and experience of the Roman troops made them victorious: but the return of domestic seditions gave the subjugated nations an opportunity of shaking off the yoke. Thus had the Romans continued for near 400 years, running the same round of wars with the same enemies, and reaping very little advantage from their conquests, till at last matters were compounded by choosing one of the consuls from among the plebeians; and from this time chiefly we may date the prosperity of Rome, so that by the time that Alexander the Great died they were held in considerable estimation among foreign nations.

25
Of the Car-
thaginians,
and of Si-
cily.

The Carthaginians in the mean time continued to enrich themselves by commerce; but, being less conversant in military affairs, were by no means equal to the Romans in power, though they excelled them in wealth. A new state, however, makes its appearance during this period; which may be said to have taught the Carthaginians the art of war, and by bringing them into the neighbourhood of the Romans proved the first source of contention between these two powerful nations. This was the island of Sicily. At what time people were first settled on it, is not now to be ascertained. The first inhabitants we read of were called *Sicani*, *Siculi*, *Lasfrignes*, &c. but of these we know little or nothing. In the second year of the seventeenth Olympiad, or 710 B. C. some Greek colonies are said to have arrived on the island, and in a short time founded several cities, of which Syracuse was the chief. The Syracusans at last subdued the original inhabitants; though it doth not appear that the latter were ever well affected to their government, and therefore were on all occasions ready to revolt. The first considerable prince, or (as he is called by the Greeks) *tyrant* of Syracuse, was Gelon, who obtained the sovereignty about the year 483 B. C. At what time the Carthaginians first carried their arms into Sicily, is not certainly known; only we are assured, that they possessed some part of the island as early as 505 B. C. For in the time of the first consuls, the Romans and Carthaginians entered into a treaty chiefly in regard to matters of navigation and commerce; by which it was stipulated, that the Romans who should touch at Sardinia, or that part of Sicily which belonged to Carthage, should be received there in the same manner as the Carthaginians themselves. Whence it appears, that the dominion of Carthage already extended over Sardinia and part of Sicily: but in 28 years after, they had been totally driven out by Gelon; which probably was the first exploit performed by him. This appears from his speech to the Athenian and Spartan ambassadors who desired his assistance against the forces of Xerxes king of Persia. The Carthaginians made many attempts to regain their possessions in this island, which occasioned long and bloody wars between them and the Greeks, as related under the articles *CARTHAGE* and *SICILY*. This island also proved

the scene of much slaughter and bloodshed in the wars of the Greeks with one another. Before the year 323 B. C. however, the Carthaginians had made themselves masters of a very considerable part of the island, from whence all the power of the Greeks could not dislodge them. It is proper also to observe, that after the destruction of Tyre by Alexander the Great, almost all the commerce in the western part of the world fell to the share of the Carthaginians. Whether they had at this time made any settlements in Spain, is not known. It is certain, that they traded to that country for the sake of the silver, in which it was very rich; as they probably also did to Britain, for the tin with which it abounded.

6. The beginning of the sixth period presents us with a state of the world entirely different from the foregoing. We now behold all the eastern part of the world, from the confines of Italy to the river Indus, and beyond it, newly united into one vast empire, and at the same time ready to fall to pieces for want of a proper head; the western world filled with fierce and savage nations, whom the rival republics of Carthage and Rome were preparing to enslave as fast as they could. The first remarkable events took place in the Macedonian empire.—Alexander, as already observed, had not distinctly named any successor; but he had left behind him a victorious, and, we may say, invincible army, commanded by most expert officers, all of them ambitious of supreme authority. It is not to be supposed that peace could long be preserved in such a situation. For a number of years, indeed, nothing was to be seen or heard of but the most horrid slaughters, and wickedness of every kind; until at last the mother, wives, children, brothers, and even sisters, of Alexander were cut off; not one of the family of that great conqueror being left alive. When matters were a little settled, four new empires, each of them of no small extent, had arisen out of the empire of Alexander. Cassander, the son of Antipater, had Macedonia, and all Greece; Antigonus, Asia-Minor; Seleucus had Babylon, and the eastern provinces; and Ptolemy Lagus, Egypt, and the western ones. One of these empires, however, quickly fell; Antigonus being defeated and killed by Seleucus and Lyfimachus at the battle of Ipsus, in 301 B. C. The greatest part of his dominions then fell to Seleucus: but several provinces took the opportunity of these confusions to shake off the Macedonian yoke altogether; and thus were formed the kingdoms of Pontus, Bithynia, Pergamus, Armenia, and Cappadocia. The two most powerful and permanent empires, however, were those of Syria founded by Seleucus, and Egypt by Ptolemy Lagus. The kings of Macedon, though they did not preserve the same authority over the Grecian states that Alexander, Antipater, and Cassander, had done, yet effectually prevented them from those outrages upon one another, for which they had formerly been so remarkable. Indeed, it is somewhat difficult to determine, whether their condition was better or worse than before they were conquered by Philip; since, though they were now prevented from destroying one another, they were most grievously oppressed by the Macedonian tyrants.

While the eastern parts of the world were thus deluged with blood, and the successors of Alexander were

Civil
History.*See *Athenians*
and *Spartans*.26
Sixth pe-
riod. Hi-
story of the
Macedo-
nian em-
pire.

Civil
History.

Civil
History.

27
Of the Ro-
mans and
Carthagi-
nians.

were pulling to pieces the empire which he had established; the Romans and Carthaginians proceeded in their attempts to enslave the nations of the west. The Romans, ever engaged in war, conquered one city and state after another, till, about the year 253 B.C. they had made themselves masters of almost the whole of Italy. During all this time they had met only with a single check in their conquests; and that was the invasion of Pyrrhus, king of Epirus. That ambitious and sly prince had projected the conquest of Italy, which he fancied would be an easy matter. Accordingly, in 271 B.C. he entered that country, and maintained a war with the Romans for six years; till at last, being utterly defeated by Curius Dentatus, he was obliged to return.

The Romans had no sooner made themselves masters of Italy, than they wanted only a pretence to carry their arms out of it; and this pretence was soon found out. Being invited into Sicily to assist the Mamertines against Hiero king of Syracuse and the Carthaginians, they immediately commenced a war with the latter, which continued with the utmost fury for 23 years. The war ended greatly to the disadvantage of the Carthaginians, chiefly owing to the bad conduct of their generals; none of whom, Hamilcar Barca alone excepted, seem to have been possessed of any degree of military skill; and the state had suffered too many misfortunes before he entered upon the command, for him or any other to retrieve it at that time. The consequence of this war was the entire loss of Sicily to the Carthaginians; and soon after, the Romans seized on the island of Sardinia.

Hamilcar perceiving that there was now no alternative, but that in a short time either Carthage must conquer Rome, or Rome would conquer Carthage, bethought himself of a method by which his country might become equal to that haughty republic. This was by reducing all Spain, in which the Carthaginians had already considerable possessions, and from the mines of which they drew great advantages. He had, therefore, no sooner finished the war with the mercenaries, which succeeded that with the Romans, than he set about the conquest of Spain. This, however, he did not live to accomplish, though he made great progress in it. His son Asdrubal continued the war with success; till at last, the Romans, jealous of his progress, persuaded him to enter into a treaty with them, by which he engaged himself to make the river Iberus the boundary of his conquests. This treaty probably was never ratified by the senate of Carthage; nor, though it had, would it have been regarded by Hannibal, who succeeded Asdrubal in the command, and had sworn perpetual enmity with the Romans. The transactions of the second Punic war are perhaps the most remarkable which the history of the world can afford. Certain it is, that nothing can shew more clearly the slight foundations upon which the greatest empires are built. We now see the Romans, the nation most remarkable for their military skill in the whole world, and who, for more than 500 years, had been constantly victorious, unable to resist the efforts of one single man. At the same time we see this man, though evidently the first general in the world, lost solely for want of a slight support. In former times,

the republic of Carthage supplied her generals in Sicily with hundreds of thousands, though their enterprises were almost constantly unsuccessful; but now Hannibal, the conqueror of Italy, was obliged to abandon his design, merely for want of 20 or 30,000 men. That degeneracy and infatuation, which never fails to overwhelm a falling nation, or rather which is the cause of its fall, had now infected the counsels of Carthage, and the supplies were denied. Neither was Carthage the only infatuated nation at this time. Hannibal, whose prudence never forsook him either in prosperity or adversity, in the height of his good fortune had concluded an alliance with Philip king of Macedon. Had that prince sent an army to the assistance of the Carthaginians in Italy immediately after the battle of Cannæ, there can be no doubt but the Romans would have been forced to accept of that peace which they so haughtily refused; and indeed, this offer of peace in the midst of so much success, is an instance of moderation which perhaps does more honour to the Carthaginian general, than all the military exploits he performed. Philip, however, could not be rouled from his inactivity, nor see that his own ruin was connected with that of Carthage. The Romans had now made themselves masters of Sicily: after which they recalled Marcellus, with his victorious army, to be employed against Hannibal; and the consequence at last was, that the Carthaginian armies, unsupported in Italy, could not conquer it, but were recalled into Africa, which the Romans had invaded. The southern nations seem to have been as blind to their own interest as the northern ones. They ought to have seen, that it was necessary for them to preserve Carthage from being destroyed; but, instead of this, Masinissa king of Numidia allied with the Romans, and by his means Hannibal was overcome at the battle of Zama, * which finished the second Punic war, in 188 B.C.

The event of the second Punic war determined the fate of almost all the other nations in the world. All this time, indeed, the empires of Egypt, Syria, and Greece, had been promoting their own ruin by mutual wars and intestine divisions. The Syrian empire was now governed by Antiochus the Great, who seems to have had little right to such a title. His empire, though diminished by the defection of the Parthians, was still very powerful; and to him Hannibal applied, after he was obliged to leave his country, as related under CARTHAGE, n^o 152. Antiochus, however, had not sufficient judgment to see the necessity of following that great man's advice; nor would the Carthaginians be prevailed upon to contribute their assistance against the nation which was soon to destroy them without any provocation. The pretence for war on the part of the Romans was, that Antiochus would not declare his Greek subjects in Asia to be free and independent states; a requisition which neither the Romans nor any other nation had a right to make. The event of all was, that Antiochus was every-where defeated, and forced to conclude a peace upon very disadvantageous terms.

In Europe, matters went on in the same way; the states of Greece, weary of the tyranny of the Macedonians, entered into a resolution of recovering their liberties.

† See Carthage, n^o 125.

* See Zama. Of Egypt and Syria.

29
Of Greece.

Civil
History.

† See Greece

30
Destruction
of Carthage
and Co-
rinth.31
History of
Egypt, Sy-
ria, and
Judea.

liberties. For this purpose was framed the Achæan League †; but, as they could not agree among themselves, they at last came to the imprudent determination of calling in the Romans, to defend them against Philip king of Macedon. This produced a war, in which the Romans were victorious. The Macedonians, however, were still formidable; and, as the intention of the Romans to enslave the whole world could no longer be doubted, Perseus, the successor of Philip, renewed the war. Through his own cowardice he lost a decisive engagement, and with it his kingdom, which submitted to the Romans in 167 B. C.

Macedon being thus conquered, the next step was utterly to exterminate the Carthaginians; whose republic, notwithstanding the many disasters that had befallen it, was still formidable. It is true, the Carthaginians were giving no offence; nay, they even made the most abject submissions to the republic of Rome: but all was not sufficient. War was declared a third time against that unfortunate state; there was now no Hannibal to command their armies, and the city was utterly destroyed 146 B. C. The same year the Romans put an end to the liberties they had pretended to grant the cities of Greece, by the entire destruction of CORINTH. See that article.

After the death of Antiochus the Great, the affairs of Syria and Egypt went on from bad to worse. The degenerate princes which filled the thrones of those empires, regarding only their own pleasures, either spent their time in oppressing their subjects, or in attempting to deprive each other of their dominions, by which means they became a more easy prey to the Romans. So far indeed were they from taking any means to secure themselves against the overgrown power of that republic, that the kings both of Syria and Egypt sometimes applied to the Romans as protectors. Their downfall, however, did not happen within the period of which we now treat.—The only other transaction which makes any considerable figure in the Syrian empire, is the oppression of the Jews by Antiochus Epiphanes. After their return from the Babylonish captivity, they continued in subjection to the Persians till the time of Alexander. From that time they were subject to the kings of Egypt or Syria, as the fortune of either happened to prevail. Egypt being reduced to a low ebb by Antiochus Epiphanes, the Jews fell under his dominion, and being severely treated by him, imprudently shewed some signs of joy on a report of his death. This brought him against them with a powerful army; and in 170 B. C. he took Jerusalem by storm, committing the most horrid cruelties on the inhabitants, in so much that they were obliged to hide themselves in caverns and in holes of rocks to avoid his fury. Their religion was totally abolished, their temple profaned, and an image of Jupiter Olympius set up on the altar of burnt-offerings; which profanation is thought to be the *abomination of desolation* mentioned by the prophet Daniel. This revolution, however, was of no long continuance. In 167 B. C. Mattathias restored the true worship in most of the cities of Judea; and, in 165, the temple was purified, and the worship there restored by Judas Maccabæus. This was followed by a long series of wars between the Syrians and Jews, in which the latter were almost always victori-

ous; and before these wars were finished, the destruction of Carthage happened, which puts an end to the sixth general period formerly mentioned.

7. The beginning of the seventh period presents us with a view of the ruins of the Greek empire in the declining states of Syria and Egypt; both of them much circumscribed in bounds. The empire of Syria at first comprehended all Asia to the river Indus, and beyond it; but in 312 B. C. most of the Indian provinces were by Seleucus ceded to one *Sandrocottus*, or *Andrococtus*, a native, who in return gave him 500 elephants. Of the empire of Sandrocottus we know nothing farther than that he subdued all the countries between the Indus and the Ganges; so that from this time we may reckon the greatest part of India independent on the Syro-Macedonian princes. In 250 B. C. however, the empire sustained a much greater loss by the revolt of the Parthians and Bactrians from Antiochus Theus. The former could not be subdued; and as they held in subjection to them the vast tract which now goes under the name of *Persia*, we must look upon their defection as an irreparable loss. Whether any part of their country was afterwards recovered by the kings of Egypt or Syria, is not very certain; nor is it of much consequence, since we are assured that in the beginning of the seventh period, i. e. 146 B. C. the Greek empires of Syria and Egypt were reduced by the loss of India, Persia, Armenia, Pontus, Bithynia, Cappadocia, Pergamus, &c. The general state of the world in 146 B. C. therefore was as follows. In Asia were the empires of India, Parthia, and Syria, with the lesser states of Armenia, Pontus, &c. above-mentioned; to which we must add that of Arabia, which, during the sixth period, had grown into some consequence, and had maintained its independency from the days of Ishmael the son of Abraham. In Africa were the kingdoms of Egypt and Ethiopia; the Carthaginian territories, now subject to the Romans; and the kingdoms of Numidia, Mauritania, and Getulia, ready to be swallowed up by the same ambitious and insatiable power, now that Carthage was destroyed, which served as a barrier against it. To the fourth lay some unknown and barbarous nations, secure by reason of their situation and insignificance, rather than their strength, or distance from Rome. In Europe we find none to oppose the progress of the Roman arms, except the Gauls, Germans, and some Spanish nations. These were brave indeed; but, through want of military skill, incapable of contending with such masters in the art of war as the Romans then were.

The Spaniards had indeed been subdued by Scipio Africanus in the time of the second Punic war: but, in 155 B. C. they revolted; and, under the conduct of one Viriathus, formerly a robber, held out for a long time against all the armies the Romans could send into Spain. Him the Consul Cæpio caused to be murdered about 138 B. C. because he found it impossible to reduce him by force. The city of Numantia defied the whole Roman power for six years longer; till at last, by dint of treachery, numbers, and perseverance, it was not taken, but the inhabitants, reduced to extremity by famine, set fire to their houses, and perished in the flames, or killed one another, so that not one remained to grace the triumph of the

32
Seventh pe-
riod. Gen-
eral state
of the
world.33
Conquests
of the Ro-
mans.

the conqueror; and this for the present quieted the rest of the Spaniards.—About the same time Attalus, king of Pergamus, left by will the Roman people heirs to all his goods; upon which they immediately seized on his kingdom as part of those goods, and reduced it to a Roman province, under the name of *Asia Proper*. Thus they continued to enlarge their dominions on every side, without the least regard to justice, to the means they employed, or to the miseries they brought upon the conquered people. In 122 B. C. the Balearic islands, now called *Majorca*, *Minorca*, and *Ivica*, were subdued, and the inhabitants exterminated; and, soon after, several of the nations beyond the Alps were obliged to submit.

In Africa the crimes of Jugurtha soon gave this ambitious republic an opportunity of conquering the kingdoms of Numidia and Mauritania; and indeed this is almost the only war in which we find the Romans engaged, where their pretensions had the least colour of justice; though in no case whatever could a nation shew more degeneracy than the Romans did on this occasion. The particulars of this war are related under the articles NUMIDIA and ROMÉ. The event of it was the total reduction of the former about the year 105 B. C. but Mauritania and Getulia preserved their liberty for some time longer.

In the east, the empire of Syria continued daily to decline; by which means the Jews not only had an opportunity of recovering their liberty, but even of becoming as powerful, or at least of extending their dominions as far, as in the days of David and Solomon. This declining empire was still farther reduced by the civil dissensions between the two brothers Antiochus Grypus and Antiochus Cyzicenus; during which the cities of Tyre, Sidon, Ptolemais, and Gaza, declared themselves independent, and in other cities tyrants started up who refused allegiance to any foreign power. This happened about 100 B. C.; and 17 years after, the whole was reduced by Tigranes, king of Armenia. On his defeat by the Romans, the latter reduced Syria to a province of their empire. The kingdom of Armenia itself, with those of Pontus, Cappadocia, and Bithynia, soon shared the same fate; Pontus, the most powerful of them all, being subdued about 64 B. C.—The kingdom of Judea also was reduced under the same power much about this time. This state owed the loss of its liberty to the same cause that had ruined several others, namely, calling in the Romans as arbitrators between two contending parties. The two sons of Alexander Jannæus (Hyrcaus and Aristobulus) contended for the kingdom. Aristobulus, being defeated by the party of Hyrcanus, applied to the Romans. Pompey the Great, who acted as ultimate judge in this affair, decided it against Aristobulus, but at the same time deprived Hyrcanus of all power as a king; not allowing him even to assume the regal title, or to extend his territory beyond the ancient borders of Judea. To such a length did Pompey carry this last article, that he obliged him to give up all those cities in Cœlosyria and Phœnicia which had been gained by his predecessors, and added them to the newly acquired Roman province of Syria.

Thus the Romans became masters of all the eastern parts of the world, from the Mediterranean sea to the

borders of Parthia. In the west, however, the Gauls were still at liberty, and the Spanish nations bore the Roman yoke with great impatience. The Gauls infested the territories of the republic by their frequent incursions, which were sometimes very terrible; and though several attempts had been made to subdue them, they always proved insufficient till the time of Julius Cæsar. By him they were totally reduced, from the river Rhine to the Pyrenæan mountains, and many of their nations almost exterminated. He carried his arms also into Germany and the southern parts of Britain; but in neither of these parts did he make any permanent conquests. The civil wars between him and Pompey gave him an opportunity of seizing on the kingdom of Mauritania and those parts of Numidia which had been allowed to retain their liberty. The kingdom of Egypt alone remained, and to this nothing belonged except the country properly so called. Cyrenaica was bequeathed by will to the Romans about 58 B. C.; and about the same time the island of Cyprus was seized by them without any pretence, except a desire of possessing the treasures of the king.—The kingdom of Egypt continued for some time longer at liberty; which in some measure must be ascribed to the internal dissensions of the republic, but more especially to the amours of Pompey, Julius Cæsar, and Marc Antony, with the famous Cleopatra queen of Egypt. The battle of Actium, however, determined the fate of Antony, Cleopatra, and Egypt itself; which last was reduced to a Roman province, about 9 B. C.

While the Romans thus employed all means to reduce the world to their obedience, they were making one another feel the same miseries at home, which they inflicted upon other nations abroad. The first civil dissensions took their rise at the siege of Numantia in Spain. We have already observed, that this small city resisted the whole power of the Romans for six years. Once they gave them a most terrible and shameful defeat, wherein 30,000 Romans fled before 4000 Numantines. Twenty thousand were killed in the battle, and the remaining ten thousand so shut up, that there was no possibility of escaping. In this extremity they were obliged to negotiate with the enemy, and a peace was concluded upon the following terms: 1. That the Numantines should suffer the Romans to retire unmolested; and, 2. That Numantia should maintain its independence, and be reckoned among the Roman allies.—The Roman senate, with an injustice and ingratitude hardly to be matched, broke this treaty, and in return ordered the commander of their army to be delivered up to the Numantines: but they refused to accept of him, unless his army was delivered along with him; upon which the war was renewed, and ended as already related. The fate of Numantia, however, was soon revenged. Tiberius Sempronius Gracchus, brother-in-law to Scipio Africanus the second, had been a chief promoter of the peace with the Numantines already mentioned, and of consequence had been in danger of being delivered up to them along with the commander in chief. This disgrace he never forgot; and, in order to revenge himself, undertook the cause of the Plebeians against the Patricians, by whom the former were greatly oppressed. He began with reviving an old law, which had enacted

34
Origin and
progress of
the civil
wars in
Rome.

enacted that no Roman citizen should possess more than 500 acres of land. The surplus he designed to distribute among those who had no lands, and to reimburse the rich out of the public treasury. This law met with great opposition, bred many tumults, and at last ended in the death of Gracchus and the persecution of his friends, several hundreds of whom were put to cruel deaths without any form of law.

The disturbances did not cease with the death of Gracchus. New contests ensued on account of the Sempronian law, and the giving to the Italian allies the privilege of Roman citizens. This last not only produced great commotions in the city, but occasioned a general revolt of the states of Italy against the republic of Rome. This rebellion was not quelled without the utmost difficulty: and in the mean time, the city was deluged with blood by the contending factions of Sylla and Marius; the former of whom sided with the patricians, and the latter with the plebeians. These disturbances ended in the perpetual dictatorship of Sylla, about 80 B. C.

From this time we may date the loss of the Roman liberty; for though Sylla resigned his dictatorship two years after, the succeeding contests between Cæsar and Pompey proved equally fatal to the republic. These contests were decided by the battle of Pharsalia, by which Cæsar became in effect master of the empire in 43 B. C. Without loss of time, he then crossed over into Africa; totally defeated the republican army in that continent; and, by reducing the country of Mauritania to a Roman province, completed the Roman conquests in these parts. His victory over the sons of Pompey at Munda 40 B. C. secured him from any further apprehensions of a rival. Being therefore sole master of the Roman empire, and having all the power of it at his command, he projected the greatest schemes; tending, according to some, not less to the happiness than to the glory of his country: when he was assassinated in the senate-house, in the 56th year of his age, and 39 B. C.

Without investigating the political justice of this action, or the motives of the perpetrators; it is impossible not to regret the death of this great man, when we contemplate his virtues, and the designs which he is said to have formed: (See *ROME*.) Nor is it possible to justify, from ingratitude at least, even the most virtuous of the conspirators, when we consider the obligations under which they lay to him. And as to the measure itself, even in the view of expediency, it seems to be generally condemned. In fact, from the transactions which had long preceded, as well as those which immediately followed, the murder of Cæsar, it is evident, that Rome was incapable of preserving its liberty any longer, and that the people had become unfit for being free. The efforts of Brutus and Cassius were therefore unsuccessful, and ended in their own destruction and that of great numbers of their followers in the battles of Philippi. The defeat of the republicans was followed by numberless disturbances, murders, proscriptions, &c. till at last Octavianus, having cut off all who had the courage to oppose him, and finally got the better of his rivals by the victory at Actium, put an end to the republic in the year 27 B. C.

The destruction of the Roman commonwealth pro-

ved advantages to the few nations of the world who still retained their liberty. That outrageous desire of conquest, which had so long marked the Roman character, now in a great measure ceased; because there was now another way of satisfying the desires of ambitious men, namely, by courting the favour of the emperor. After the final reduction of the Spaniards, therefore, and the conquest of the countries of Media, Pannonia, and some others adjacent to the Roman territories, and which in a manner seemed naturally to belong to them, the empire enjoyed for some time a profound peace.

The only remarkable transactions which took place during the remainder of the period of which we treat were the conquest of Britain by Claudius and Agricola, and the destruction of Jerusalem by Vespasian and Titus. The war with the Jews began A. D. 67; and was occasioned by their obstinately claiming the city of Cæsarea, which the Romans had added to the province of Syria. It ended in 73, with the most terrible destruction of their city and nation; since which time they have never been able to assemble as a distinct people. The southern parts of Britain were totally subdued by Agricola about ten years after.

In the 98th year of the Christian æra, Trajan was created emperor of Rome; and being a man of great valour and experience in war, carried the Roman conquests to their utmost extent. Having conquered the Dacians, a German nation beyond the Danube, and who had of late been very troublesome, he turned his arms eastward; reduced all Mesopotamia, Chaldæa, Assyria; and having taken Ctesiphon, the capital of the Parthian empire, appointed them a king, which he thought would be a proper method of keeping that warlike people in subjection. After this, he proposed to return to Italy, but died by the way; and with his reign the seventh general period above-mentioned is concluded.

8. The beginning of the eighth period presents us with a view of one vast empire, in which almost all the nations of the world were swallowed up. This empire comprehended the best part of Britain, all Spain, France, the Netherlands, Italy, part of Germany, Egypt, Barbary, Bulgaria, Turkey in Europe, Turkey in Asia, and Persia. The state of India at this time is unknown. The Chinese lived in a remote part of the world, unheard of and unmolested by the western nations who struggled for the empire of the world. The northern parts of Europe and Asia were filled with barbarous nations, already formidable to the Romans, and who were soon to become more so. The vast empire of the Romans, however, had no sooner attained its utmost degree of power, than, like others before it, it began to decline. The provinces of Babylonia, Mesopotamia, and Assyria, almost instantly revolted, and were abandoned by Adrian the successor of Trajan in the empire. The Parthians having recovered their liberty, continued to be very formidable enemies, and the barbarians of the northern parts of Europe continued to increase in strength; while the Romans, weakened by intestine divisions, became daily less able to resist them. At different times, however, some warlike emperors arose, who put a stop to the incursions of these barbarians; and about the year 215, the Parthian empire was totally overthrown by the Persians,

fians, who had long been subject to them. This revolution proved of little advantage to the Romans. The Persians were enemies still more troublesome than the Parthians had been; and though often defeated, they still continued to infect the empire on the east, as the barbarous nations of Europe did on the north. In 260, the defeat and captivity of the emperor Valerian by the Persians, with the disturbances which followed, threatened the empire with utter destruction. Thirty tyrants seized the government at once, and the barbarians pouring in on all sides in prodigious numbers ravaged almost all the provinces of the empire. By the vigorous conduct of Claudius, Aurelian, Tacitus, Probus, and Carus, the empire was restored to its former lustre; but as the barbarians were only repulsed, and never thoroughly subdued, this proved only a temporary relief. What was worse, the Roman soldiers, grown impatient of restraint, commonly murdered those emperors who attempted to revive among them the ancient military discipline which alone could ensure the victory over their enemies. Under Dioclesian, the disorders were so great, that though the government was held by two persons, they found themselves unable to bear the weight of it, and therefore took other two partners in the empire. Thus was the Roman empire divided into four parts; which by all historians is said to have been productive of the greatest mischiefs. As each of the four sovereigns would have many officers both civil and military, and the same number of forces that had been maintained by the state when governed only by one emperor, the people were not able to pay the sums necessary for supporting them. Hence the taxes and imposts were increased beyond measure, the inhabitants in several provinces reduced to beggary, the land left untilled for want of hands, &c. An end was put to these evils when the empire was again united under Constantine the Great; but in 330 a mortal blow was given to it by removing the imperial seat to Byzantium, now Constantinople, and making it equal to Rome. The introduction and establishment of Christianity, already corrupted with the grossest superstitions, proved also a most grievous detriment to the empire. Instead of that ferocious and obstinate valour in which the Romans had so long been accustomed to put their trust, they now imagined themselves secured by signs of the cross, and other external symbols of the Christian religion. These they used as a kind of magical incantations, which undoubtedly proved at all times ineffectual, and hence also in some measure proceeded the great revolution which took place in the next period.

9. The ninth general period shews us the decline and miserable end of the western part of the Roman empire. We see that mighty empire, which formerly occupied almost the whole world, now weakened by division, and surrounded by enemies. On the east, the Persians; on the north, the Scythians, Sarmatians, Goths, and a multitude of other barbarous nations, watched all occasions to break into it; and miscarried in their attempts, rather through their own barbarity, than the strength of their enemies. The devastations committed by those barbarians when they made their incursions are incredible, and the relation shocking to human nature. Some authors seem much inclined to favour them; and even insinuate, that barbarity and

Vol. V.

ignorant ferocity were their chief, if not their only faults: but from their history it plainly appears, that not only barbarity and the most shocking cruelty, but the highest degrees of avarice, perfidy, and disregard to the most solemn promises, were to be numbered among their vices. It was ever a sufficient reason for them to make an attack, that they thought their enemies could not resist them. Their only reason for making peace, or for keeping it, was because their enemies were too strong; and their only reason for committing the most horrid massacres, rapes, and all manner of crimes, was, because they had gained a victory. The Romans, degenerate as they were, are yet to be esteemed much better than these savages; and therefore we find not a single province of the empire that would submit to the barbarians, while the Romans could possibly defend them.

Some of the Roman emperors indeed withstood this inundation of savages; but as the latter grew daily more numerous, and the Romans continued to weaken themselves by their intestine divisions, they were at last obliged to take large bodies of barbarians into their pay, and teach them their military discipline, in order to drive away their countrymen, or others who invaded the empire. This at last proved its total destruction; for, in 476, the barbarians who served in the Roman armies, and were dignified with the title of *allies*, demanded the third part of the lands of Italy as a reward for their services: but meeting with a refusal, they revolted, and made themselves masters of the whole country, and of Rome itself, which from that time ceased to be the head of an empire of any consequence.

This period exhibits a most unfavourable view of the western parts of the world: The Romans, from the height of grandeur, sunk to the lowest slavery, nay, in all probability, almost exterminated; the provinces they formerly governed, inhabited by human beings scarce a degree above the brutes; every art and science lost; and the savage conquerors even in danger of starving for want of a sufficient knowledge of agriculture, having now no means of supplying themselves by plunder and robbery as before. Britain had long been abandoned to the mercy of the Scots and Picts; and in 450 the inhabitants had called in the Saxons to their assistance, whom they soon found worse enemies than those against whom they had implored their aid. Spain was held by the Goths and Suevians; Africa (that is, Barbary and Bildulgerid,) by the Vandals; the Burgundians, Goths, Franks, and Alans, had erected several small states in Gaul; and Italy was subjected to the Heruli under Odoacer, who had taken upon him the title of *king of Italy*. In the east, indeed, matters were an aspect somewhat more agreeable. The Roman empire continued to live in that of Constantinople, which was still very extensive. It comprehended all Asia-Minor and Syria, as far as Persia; in Africa, the kingdom of Egypt; and Greece in Europe. The Persians were powerful, and rivalled the emperors of Constantinople; and beyond them lay the Indians, Chinese, and other nations, who, unheard-of by the inhabitants of the more western parts, enjoyed peace and liberty.

The Constantinopolitan empire continued to decline

20 Y

by

39
General
state of the
world.

37
Ninth pe-
riod. De-
struction
of the
western
empire.

Civil
History.

by reason of its continual wars with the Persians, Bulgarians, and other barbarous nations; to which also superstition and relaxation of military discipline largely contributed. The Persian empire also declined, from the same causes, together with the intestine broils from which it was seldom free more than that of Constantinople. The history of the eastern part of the world during this period, therefore, consists only of the wars between these two great empires, of which an account is given under the articles CONSTANTINOPLE and PERSIA; and which were productive of no other consequence than that of weakening them both, and making them a more easy prey to those enemies who were now as it were in embryo, but shortly about to erect an empire almost as extensive as that of the Greeks or Romans.

39
History of
Italy.

Among the western nations, the revolutions, as might naturally be expected from the character of the people, succeeded one another with rapidity. The Heruli under Odoacer were driven out by the Goths under Theodoric. The Goths were expelled by the Romans; and, while the two parties were contending, both were attacked by the Franks, who carried off an immense booty. The Romans were in their turn expelled by the Goths: the Franks again invaded Italy, and made themselves masters of the province of Venetia; but at last the superior fortune of the emperor of Constantinople prevailed, and the Goths were finally subdued in 553. Narles, the conqueror of the Goths, governed Italy as a province of the eastern empire till the year 568, when Longinus his successor made considerable alterations. The Italian provinces had, ever since the time of Constantine the Great, been governed by *consulares*, *correctores*, and *prefides*; no alteration having been made either by the Roman emperors or the Gothic kings. But Longinus, being invested with absolute power by Justinian, suppressed those magistrates; and, instead of them, placed in each city of note a governor, whom he distinguished with the title of *duke*. The city of Rome was not more honoured than any other; for Longinus, having abolished the very name of *senate* and *consuls*, appointed a *duke* of Rome as well as of other cities. To himself he assumed the title of *exarch*; and, residing at Ravenna, his government was styled the *exarchate of Ravenna*. But while he was establishing this new empire, the greatest part of Italy was conquered by the Lombards.

40
Of France.

In France a considerable revolution also took place. In 487, Clovis, the founder of the present French monarchy, possessed himself of all the countries lying between the Rhine and the Loire. By force or treachery, he conquered all the petty kingdoms which had been erected in that country; his dominions had been divided, re-united, and divided again; and were on the point of being united a second time, when the great impostor Mahomet began to make a figure in the world.

41
Of Spain.

In Spain, the Visigoths erected a kingdom, ten years before the conquest of Rome by the Heruli. This kingdom they had extended eastward, about the same time that Clovis was extending his conquests to the west; so that the two kingdoms met at the river Loire. The consequence of this approach of such barbarous conquerors towards each other, was an

immediate war. Clovis proved victorious, and subdued great part of the country of the Visigoths, which put a final stop to their conquests on that side.

Another kingdom had been founded in the western parts of Spain by the Suevi, a considerable time before the Romans were finally expelled from that country. In 409 this kingdom was entirely subverted by Theodoric king of the Goths; and the Suevi were so pent up in a small district of Lusitania and Galicia, that it seemed impossible for them to recover themselves. During the abovementioned period, however, while the attention of the Goths was turned another way, they had found means again to erect themselves into an independent state, and to become masters of considerably extended territories. But this success proved of short duration. In 584 the Goths attacked them; totally destroyed their empire a second time; and thus became masters of all Spain, except some small part which still owed subjection to the emperors of Constantinople. Of this part, however, the Goths became masters also in the year 623; which concludes the 9th general period.

Africa, properly so called, had changed its masters ⁴²Of Africa, three times during this period. The Vandals had expelled the Romans, and erected an independent kingdom, which was at last overturned by the emperors of Constantinople; and from them the greatest part of it was taken by the Goths in 620.

10. At the commencement of the tenth general period, ⁴³Tenth general period. Conquests of the Saracens. (which begins with the flight of Mahomet in the year 622, from whence his followers date their æra, called the *Hegira*), we see every thing prepared for the great revolution which was now to take place: the Roman empire in the west annihilated; the Persian empire and that of Constantinople weakened by their mutual wars and intestine divisions; the Indians and other eastern nations unaccustomed to war, and ready to fall a prey to the first invader; the southern parts of Europe in a distracted and barbarous state; while the inhabitants of Arabia, from their earliest origin, accustomed to war and plunder, and now united by the most violent superstition and enthusiastic desire of conquest, were like a flood pent up, and ready to overwhelm the rest of the world.—The northern nations of Europe and Asia, however formidable in after-times, were at present unknown, and peaceable, at least with respect to their southern neighbours; so that there was in no quarter of the globe any power capable of opposing the conquests of the Arabs. With amazing celerity, therefore, they over-ran all Syria, Palestine, Persia, Bakharia, and India, extending their conquests farther to the eastward than ever Alexander had done. On the west side their empire extended over Egypt, Barbary, and Spain, together with the islands of Sicily, Sardinia, Majorca, Minorca, &c. and many of the Archipelago islands: nor were the coasts of Italy itself free from their incursions; nay, they are even said to have reached the distant and barren country of Iceland. At last this great empire, as well as others, began to decline. Its ruin was very sudden, and owing to its internal divisions. Mahomet had not taken care to establish the apostleship in his family, or to give any particular directions about a successor. The consequence of this was, that the caliph, or succession

to the apostleship, was seized by many usurpers in different parts of the empire; while the true caliphs, who resided at Bagdad, gradually lost all power, and were regarded only as a kind of high-priests. Of these divisions the Turks took advantage to establish their authority in many provinces of the Mohammedan empire: but as they embraced the same religion with the Arabs, and were filled with the same enthusiastic desire of conquest, it is of little consequence to distinguish between them; as indeed it signified little to the world in general whether the Turks or Saracens were the conquerors, since both were cruel, barbarous, ignorant, and superstitious.

44
Of the
Pope's tem-
poral
power.

While the barbarians of the east were thus grasping at the empire of the whole world, great disturbances happened among the no less barbarous nations of the west. Superstition seems to have been the ruling motive in both cases. The Saracens and Turks conquered for the glory of God, or of his apostle Mahomet and his successors; the western nations professed an equal regard for the divine glory, but which was only to be perceived in the respect they paid to the Pope and clergy. Ever since the establishment of Christianity by Constantine, the bishops of Rome had been gradually extending their power, and attempting not only to render themselves independent, but even to assume an authority over the emperors themselves. The destruction of the empire was so far from weakening their power, that it afforded them opportunities of greatly extending it, and becoming judges of the sovereigns of Italy themselves, whose barbarity and ignorance prompted them to submit to their decisions. All this time, however, they themselves had been in subjection to the emperors of Constantinople; but on the decline of that empire, they found means to get themselves exempted from this subjection. The principal authority in the city of Rome was then engrossed by the bishop; though of right it belonged to the duke appointed by the exarch of Ravenna. But tho' they had now little to fear from the eastern emperors, they were in great danger from the ambition of the Lombards, who aimed at the conquest of all Italy. This aspiring people the bishops of Rome determined to check; and therefore, in 726, when Luitprand king of the Lombards had taken Ravenna and expelled the exarch, the pope undertook to restore him. For this purpose he applied to the Venetians, who are now first mentioned in history as a state of any consequence; and by their means the exarch was restored. Some time before, a quarrel had happened between the pope (Gregory II.) and Leo emperor of the east, about the worship of images. Leo, who it seems, in the midst of so much barbarism, had still preserved some share of common sense and reason, reprobated the worship of images in the strongest terms, and commanded them to be destroyed throughout his dominions. The pope, whose cause was favoured by the most absurd superstitions, and by these only, refused to obey the emperor's commands. The exarch of Ravenna, as a subject of the emperor, was ordered to force the pope to a compliance, and even to seize or assassinate him in case of a refusal. This excited the pious zeal of Luitprand to assist the pope, whom he had formerly designed to subdue: the exarch was first excommunicated, and then torn in pieces by the enra-

ged multitude: the duke of Naples shared the same fate; and a vast number of the *Iconoclasts*, or Image-breakers, as they were called, were slaughtered without mercy: and to complete all, the subjects of the exarchate, at the instigation of the pope, renounced their allegiance to the emperor.

Leo was no sooner informed of this revolt, than he ordered a powerful army to be raised, in order to reduce the rebels, and take vengeance on the pope. Alarmed at these warlike preparations, Gregory looked round for some power on which he might depend for protection. The Lombards were possessed of sufficient force, but they were too near and too dangerous neighbours to be trusted; the Venetians, though zealous Catholics, were as yet unable to withstand the force of the empire; Spain was over-run by the Saracens: the French seemed, therefore, the only people to whom it was advisable to apply for aid; as they were able to oppose the emperor, and were likewise enemies to his edict. Charles Martel, who at that time governed France as mayor of the palace, was therefore applied to; but before a treaty could be concluded, all the parties concerned were removed by death. Constantine Copronymus, who succeeded Leo at Constantinople, not only persisted in the opposition to image-worship, begun by his predecessor, but prohibited also the invocation of saints. Zachary, who succeeded Gregory III. in the pontificate, proved as zealous an adversary as his predecessors. Pepin, who succeeded Charles Martel in the sovereignty of France, proved as powerful a friend to the pope as his father had been. The people of Rome had nothing to fear from Constantinople; and therefore drove out all the emperor's officers. The Lombards, awed by the power of France, for some time allowed the pope to govern in peace the dominions of the Exarchate; but in 752, Astolphus, king of Lombardy, not only reduced the greatest part of the pope's territories, but threatened the city of Rome itself. Upon this an application was made to Pepin, who obliged Astolphus to restore the places he had taken, and gave them to the pope, or, as he said, to St Peter. The Greek emperor, to whom they of right belonged, remonstrated to no purpose. The pope from that time became possessed of considerable territories in Italy; which, from the manner of their donation, go under the name of *St Peter's Patrimony*. It was not however before the year 774 that the pope was fully secured in these new dominions. This was accomplished when the kingdom of the Lombards was totally destroyed by Charlemagne, who was thereupon crowned king of Italy. Soon after this monarch made himself master of all the Low Countries, Germany, and part of Hungary; and in the year 800, was solemnly crowned emperor of the west by the pope.

Thus was the world once more shared among three great empires. The empire of the Arabs or Saracens extended from the river Ganges to Spain, comprehending almost all of Asia and Africa which has ever been known to Europeans, the kingdoms of China and Japan excepted. The eastern Roman empire was reduced to Greece, Asia Minor, and the provinces adjoining to Italy. The empire of the west under Charlemagne, comprehended France, Germany, and the greatest part of Italy. The Saxons, however, as yet

45
General
state of the
world.

possessed Britain unmolested by external enemies, thro' the seven kingdoms erected by them were engaged in perpetual contests. The Venetians also enjoyed a nominal liberty; though it is probable, that their situation would render them very much dependent on the great powers which surrounded them. Of all nations on earth, the Scots and Picts, and the remote ones of China and Japan seem to have enjoyed, from their situation, the greatest share of liberty; unless, perhaps, we except the Scandinavians, who, under the names of *Danes* and *Normans*, were soon to infect their southern neighbours. But of all the European potentates, the popes certainly exercised the greatest authority; since even Charlemagne himself submitted to accept the crown from their hands, and his successors made them the arbiters of their differences.

Matters, however, did not long continue in this state. The empire of Charlemagne, was, on the death of his son Lewis, divided among his three children. Endless disputes and wars ensued among them, till at last the sovereign power was seized by Hugh Capet in 987. The Saxon heptarchy was dissolved in 827, and the whole kingdom of England reduced under one head. The Danes and Normans began to make depredations, and infect the neighbouring states. The former conquered the English Saxons, and seized the government, but were in their turn expelled by the Normans in 1066. In Germany and Italy the greatest disturbances arose from the contests between the popes and the emperors. To all this, if we add the internal contests which happened through the ambition of the powerful barons of every kingdom, we can scarce form an idea of times more calamitous than those of which we now treat. All Europe, nay, all the world, was one great field of battle; for the empire of the Mahometans was not in a more settled state than that of the Europeans. Caliphs, sultans, emirs, &c. waged continual war with each other in every quarter; new sovereignties every day sprung up, and were as quickly destroyed. In short, thro' the ignorance and barbarity with which the whole world was overspread, it seemed in a manner impossible that the human race could long continue to exist; when happily the crusades, by directing the attention of the Europeans to one particular object, made them in some measure suspend their slaughters of one another.

11. The crusades originated from the superstition of the two grand parties into which the world was at that time divided, namely, the Christians and Mahometans. Both looked upon the small territory of Palestine, which they called the *Holy Land*, to be an invaluable acquisition, for which no sum of money could be an equivalent; and both took the most unjustifiable methods to accomplish their desires. The superstition of Omar the second caliph had prompted him to invade this country, part of the territories of the Greek emperor, who was doing him no hurt; and now when it had been so long under the subjection of the Mahometans, a similar superstition prompted the pope to send an army for the recovery of it. The crusaders accordingly poured forth in multitudes, like those with which the kings of Persia formerly invaded Greece; and their fate was pretty similar. Their impetuous valour at first, indeed, carried every thing before them: they recovered all Palestine, Phœnicia, and part of Syria, from the in-

fidels; but their want of conduct soon lost what their valour had obtained, and very few of that vast multitude which had left Europe ever returned to their native countries. A second, a third, and several other crusades, were preached, and were attended with a like success in both respects; vast numbers took the cross, and repaired to the Holy Land, which they polluted by the most abominable massacres and treacheries, and from which very few of them returned. In the third crusade Richard I. of England was embarked, who seems to have been the best general that ever went into the east; but even his valour and skill were not sufficient to repair the faults of his companions, and he was obliged to return even after he had entirely defeated his antagonists, and was within sight of Jerusalem.

But while the Christians and Mahometans were thus ⁴⁷superstitiously contending for a small territory in the western parts of Asia, the nations in the more easterly ⁴⁸parts were threatened with total extermination. Jenghiz Khan, the greatest, as well as the most bloody, conqueror that ever existed, now makes his appearance. The rapidity of his conquests seemed to emulate those of Alexander the Great; and the cruelties he committed were altogether unparalleled. It is worth observing, that Jenghiz Khan and all his followers were neither Christians nor Mahometans, but strict deists. For a long time even the sovereign had not heard of a temple or any particular place on earth appropriated by the Deity to himself, and treated the notion with ridicule when it was first mentioned to him.

The Moguls, over whom Jenghiz Khan assumed the sovereignty, were a people of East Tartary, divided into a great number of petty governments as they are at this day, but who owed a subjection to one sovereign whom they called *Vang-khan*, or the Great Khan. Temujin, afterwards *Jenghiz-Khan*, was one of these petty princes, but unjustly deprived of the greatest part of his inheritance at the age of 13, which he could not recover till he arrived at that of 40. This corresponds with the year 1201, when he totally reduced the rebels, and as a specimen of his lenity caused 70 of their chiefs to be thrown into as many caldrons of boiling water. In 1202, he defeated and killed Vang-khan himself (known to the Europeans by the name of *Prestor John of Asia*); and possessing himself of his vast dominions, became from thenceforward altogether irresistible. In 1206, having still continued to enlarge his dominions, he was declared khan of the Moguls and Tartars; and took upon him the title of *Jenghiz Khan*, or *The most Great Khan of khans*. This was followed by the reduction of the kingdom of Hya in China, Tangut, Kitay, Turkestan, Karazm (the kingdom of GAZNA founded by Mahmud Gazi), Great Bukharia, Persia, and part of India; and all these vast regions were reduced in 26 years. The devastations and slaughters with which they were accompanied are unparalleled, no fewer than 14,470,000 persons being computed to have been massacred by Jenghiz Khan during the last 22 years of his reign. In the beginning of 1227 he died, thereby freeing the world from a most bloody tyrant. His successors completed the conquest of China and Korea; but were foiled in their attempts on Cochinchina, Tong-king, and Japan. On the western side the

Tartar

Tartar dominions were not much enlarged till the time of Hulaku, who conquered Media, Babylonia, Mesopotamia, Assyria, Syria, Georgia, Armenia, and almost all Asia Minor; putting an end to the empire of the Saracens by the taking of Bagdad in 1258.

The empire of Jenghiz Khan had the fate of all others. Being far too extensive to be governed by one head, it split into a multitude of small kingdoms, as it had been before his time. All these princes, however, owned allegiance to the family of Jenghiz Khan till the time of Timur Bek, or Tamerlane. The Turks, in the mean time, urged forward by the inundation of Tartars who poured in from the east, were forced upon the remains of the Greek empire; and at the time of Tamerlane above-mentioned, they had almost confined this once mighty empire within the walls of Constantinople.

In the year 1335 the family of Jenghiz Khan becoming extinct in Persia, a long civil war ensued, during which Timur Bek, one of the petty princes among which the Tartar dominions were divided, found means to aggrandize himself in a manner similar to what Jenghiz Khan had done about 150 years before. Jenghiz Khan, indeed, was the model whom he proposed to imitate; but it must be allowed that Timur was more merciful than Jenghiz Khan, if indeed the word can be applied to such inhuman tyrants. The plan on which Jenghiz Khan conducted his expeditions was that of total extermination. For some time he utterly extirpated the inhabitants of those places which he conquered, designing to people them anew with his Moguls; and in consequence of this resolution, he would employ his army in beholding 100,000 prisoners at once. Timur's cruelty, on the other hand, seldom went farther than the pounding of 3 or 4000 people in large mortars, or building them among bricks and mortar into a wall. We must observe, however, that Timur was not a Deist, but a Mahometan, and conquered expressly for the purpose of spreading the Mahometan religion; for the Moguls had now adopted all the superstitions and absurdities of Mahomet. Thus was all the eastern quarter of the world threatened anew with the most dreadful devastations, while the western nations were exhausting themselves in fruitless attempts to regain the Holy Land. The Turks were the only people who seem at this period to have been gathering strength, and by their perpetual encroachments threatened to swallow up the western nations, as the Tartars had done the eastern ones.

In 1362, Timur invaded Bukharia, which he reduced in five years. He proceeded in his conquests, though not with the same celerity as Jengiz Khan, till the year 1387, when he had subdued all Persia, Armenia, Georgia, Karazm, and great part of Tartary. After this he proceeded westward, subduing all the countries to the Euphrates: made himself master of Bagdad; and even entered Russia, where he pillaged the city of Moscow. From thence he turned his arms to the east, and totally subdued India. In 1393, he invaded and reduced Syria; and having turned his arms against the Turks, forced their sultan Bajazet to raise the siege of Constantinople. This brought on an engagement, in which Bajazet was entirely defeated and taken prisoner; which broke the power of the Turks

to such a degree, that they were not for some time able to recover themselves. At last this great conqueror died in the year 1405, while on his way to conquer China, as Jenghiz Khan had done before him.

The death of Timur was followed almost immediately by the dissolution of his empire. Most of the nations he had conquered, recovered their liberty. The Turks had now no further obstacle to their conquest of Constantinople. The western nations having exhausted themselves in the *holy wars*, as they were called, had lost that insatiable thirst after conquest which for so long time possessed the minds of men. They had already made considerable advances in civilization, and began to study the arts of peace. Gunpowder was invented, and its application to the purposes of war already known; and, though no invention threatened to be more destructive, perhaps none was ever more beneficial to the human race. By the use of fire-arms, nations are put more on a level with each other than formerly they were; war is reduced to a regular system, which may be studied with as much success as any other science. Conquests are not now to be made with the same ease as formerly; and hence the last ages of the world have been much more quiet and peaceable than the former ones. In 1453, the conquest of Constantinople by the Turks fixed that wandering people to one place; and though now they possess very large regions both in Europe, Asia, and Africa, an effectual stop hath long been put to their further progress.

About this time also, learning began to revive in Europe, where it had been long lost; and the invention of PRINTING, which happened about the same time, rendered it in a manner impossible for barbarism ever to take place in such a degree as formerly. All nations of the world, indeed, seem now at once to have laid aside much of their former ferocity; and, though wars have by no means been uncommon, they have not been carried on with such circumstances of fury and savage cruelty as before. Instead of attempting to enrich themselves by plunder, and the spoils of their neighbours, mankind in general have applied themselves to commerce, the only true and durable source of riches. This soon produced improvements in navigation; and these improvements led to the discovery of many regions formerly unknown. At the same time, the European powers being at last thoroughly sensible, that extensive conquests could never be permanent, applied themselves more to provide for the security of those dominions which they already possessed, than to attempt the conquest of one another: and this produced the policy to which so much attention was lately paid, namely, the *preserving of the balance of Europe*; that is, preventing any one of the nations from acquiring sufficient strength to overpower another.

In the end of the 15th century, the vast continent of America was discovered; and, almost at the same time, the passage to the East-Indies by the Cape of Good-Hope. The discovery of these rich countries gave a new turn to the ambition of the Europeans. To enrich themselves, either by the gold and silver produced in these countries, or by traffic with the natives, now became the object. The Portuguese had

49
State of the
world since
that time.

the advantage of being the first discoverers of the eastern, and the Spaniards of the western countries. The former did not neglect so favourable an opportunity of enriching themselves by commerce. Many settlements were formed by them in the East-India islands, and on the continent; but their avarice and perfidious behaviour towards the natives, proved at last the cause of their total expulsion. The Spaniards enriched themselves by the vast quantities of the precious metals imported from America, which were not obtained but by the most horrid massacres committed on the natives, and of which an account is given under the different names of the American countries. These possessions of the Spaniards and Portuguese soon excited other European nations to make attempts to share with them in their treasures, by planting colonies in different parts of America, and making settlements in the East-Indies: and thus has the rage of war in some measure been transferred from Europe to these distant regions; and after various contests, the British at last obtained a great superiority both in America and the East-Indies.

In Europe the only considerable revolutions which happened during this period, were, The total expulsion of the Moors or Saracens from Spain, by the taking of Grenada in 1491; the union of the kingdoms of Arragon and Castile, by the marriage of Ferdinand and Isabella; and the revolt of the states of Holland from the Spaniards. After much contention and bloodshed, these last obtained their liberty, and were declared a free people in 1609; since which time they have continued an independent and very considerable nation of Europe.

The European nations at the beginning of the 17th century were, Sweden, Muscovy, Denmark, Poland, Britain, Germany, Holland, France, Spain, Portugal, Italy, and Turkey in Europe. Of these the Russians, though the most barbarous, were by far the most considerable, both in regard to numbers and the extent of their empire; but their situation made them little feared by the others, who lay at a distance from them. The kingdom of Poland, which was first set up in the year 1000, proved a barrier betwixt Russia and Germany; and at the same time the policy abovementioned of keeping up the balance of power in Europe, rendered it probable that no one European nation, whatever wars it might be engaged in, would have been totally destroyed, or ceased to exist as a distinct kingdom. The late dismemberment of Poland, however, or its partition between the three powers Russia, Hungary, and Prussia, seems to be a step very unfavourable to the liberties of Europe in general. The revolt of the British colonies in America, must be a considerable diminution of the strength of Great Britain: the advantage taken by France and Spain of an event so favourable to their ambition, the duplicity and evasions of her allies, and the unconcerned or unfriendly aspect of the other powers, seem to indicate a total disregard of that equilibrium formerly so much and so wisely attended to.

In Asia nothing of importance hath happened since the taking of Constantinople by the Turks. That continent is now divided among the following nations. The most northerly part, called *Siberia*, extending to the very extremity of the continent, is under the

power of Russia. To the southward, from Asia Minor to China and Korea, are the Tartars, formidable indeed from their numbers, but, by reason of their barbarity and want of union, incapable of attempting any thing. The Turks possess the Western part of the continent called *Asia Minor*, to the river Euphrates. The Arabs are again confined within their own peninsula; which they possess, as they have ever done, without owning subjection to any foreign power. To the east of Turkey in Asia lies Persia, now more confined in its limits than before; and to the eastward of Persia lies India, or the kingdom of the Mogul, comprehending all the country from the Indus to the Ganges, and beyond that river. Still farther to the east lie the kingdoms of Siam, Pegu, Thibet, and Cochin-China, little known to the Europeans. The vast empire of China occupies the most easterly part of the continent, while that of Japan comprehends the islands which go by that name, and which are supposed to lie at no great distance from the western coasts of America.

In Africa the Turks possess Egypt, which they conquered in 1517, and have a nominal jurisdiction over the states of Barbary. The interior parts are filled with barbarous and unknown nations, as they have always been. On the western coasts are many settlements of the European nations, particularly the British and Portuguese, and the southern extremity is possessed by the Dutch. The eastern coasts are almost totally unknown. The Asiatic and African islands are either possessed by the Europeans, or inhabited by savage nations.

SECT. II. Ecclesiastical History.

THE history of religion, among all the different ^{so} ^{Revolutions} nations that have existed in the world, is a subject no less important and interesting than that of civil history. It is, however, less fertile of great events, ^{happen,} affords an account of fewer revolutions, and is much more uniform, than civil history. The reason of this is plain. Religion is conversant about things which cannot be seen; and which of consequence cannot suddenly and strongly affect the senses of mankind, as natural things are apt to do. The expectation of worldly riches can easily induce one nation to attack another; but it is not easy to find any thing which will induce a nation to change its religion. The invisible nature of spiritual things, the prejudice of habit and of early education, all stand in the way of changes of this kind. Hence the revolutions in religion have been but few, and the duration of almost any religion, of longer standing than the most celebrated empires; the changes which have happened, in general have acquired a long time to bring them about, and history scarce affords an instance of the religion of any nation being essentially and suddenly changed for another.

With regard to the origin of religion, we must have recourse to the Scriptures; and are as necessarily constrained to adopt the account there given, as we are to adopt that of the creation given in the same book; namely, because no other hath made its appearance which seems in any degree rational, or consistent with itself.—In what manner the true religion given

given to Adam was falsified or corrupted by his descendants before the flood, doth not clearly appear from Scripture. Idolatry is not mentioned: nevertheless we are assured that the inhabitants of the world were then exceedingly wicked; and as their wickedness did not consist in worshipping false gods, it may be concluded that they worshipped none at all; i. e. that the crime of the antediluvians was delirium or atheism.

51
Origin of idolatry.

After the flood, idolatry quickly made its appearance; but what gave rise to it, is not certainly known. This superstition indeed seems to be natural to man, especially when placed in such a situation that he hath little opportunity of instruction, or of improving his rational faculties. This seems also probable from a caution given to the Jews, lest, when they looked up to the sun, moon, and stars, and the rest of the host of heaven, they should be driven to worship them. The origin of idolatry among the Syrians and Arabians, and also in Greece, is therefore accounted for with great probability in the following manner by the author of *The Ruins of Balbec*. "In those uncomfortable deserts, where the day presents nothing to the view but the uniform, tedious, and melancholy prospect of barren sands, the night discloses a most delightful and magnificent spectacle, and appears arrayed with charms of the most attractive kind. For the most part unclouded and serene, it exhibits to the wondering eye the host of heaven in all their variety and glory. In the view of this stupendous scene, the transition from admiration to idolatry was too easy to uninstructed minds; and a people whose climate offered no beauties to contemplate but those of the firmament, would naturally look thither for the objects of their worship. The form of idolatry in Greece was different from that of the Syrians, which perhaps may be attributed to that smiling and variegated scene of mountains, valleys, rivers, woods, groves, and fountains, which the transported imagination, in the midst of its pleasing astonishment, supposed to be the seats of invisible deities."

A difficulty, however, arises on this supposition; for if idolatry is naturally produced in the mind of uninstructed and savage man, from a view of the creation, why hath not idolatry of some kind or other taken place among all the different nations of the world. This certainly hath not been the case; of which the most striking examples are the Persians of old, and the Moguls in more modern times. Both these nations were strict Deists: so that we must allow some other causes to concur in producing idolatry besides those already mentioned; and of these causes an imperfect and obscure notion of the true religion seems to be the most probable.

Though idolatry, therefore, was formerly very prevalent, it neither extended over the whole earth, nor were the superstitions of the idolaters all of one kind. Every nation had its respective gods, over which one more excellent than the rest was said to preside; yet in such a manner, that this supreme deity himself was controuled by the rigid empire of the fates, or by what philosophers called *eternal necessity*. The gods of the east were different from those of the Gauls, the Germans, and the other northern nations. The Grecian divinities differed widely from those of the Egyptians, who deified plants, animals, and a great

variety of the productions both of nature and art. Each people also had their own particular manner of worshipping and appeasing their respective deities, entirely different from the sacred rites of other countries. All this variety of religions, however, produced neither wars nor dissensions among the different nations; each nation suffered its neighbours to follow their own method of worship, without discovering any displeasure on that account. There is nothing surprising in this mutual toleration, when we consider, that they all looked upon the world as one great empire, divided into various provinces, over each of which a certain order of divinities presided; for which reason they imagined that none could behold with contempt the gods of other nations, or force strangers to pay homage to theirs.—The Romans exercised this toleration in the most ample manner; for though they would not allow any change to be made in the religions that were publicly professed in the empire, nor any new form of worship to be openly introduced, yet they granted to their citizens a full liberty of observing in private the sacred rites of other nations, and of honouring foreign deities as they thought proper.

The heathen deities were honoured with rites and sacrifices of various kinds, according to their respective natures and offices. Their rites were absurd and ridiculous; while the priests, appointed to preside over this strange worship, abused their authority, by deceiving and imposing upon the people in the grossest manner.

From the time of the flood to the coming of Christ, idolatry prevailed among almost all the nations of the world, the Jews alone excepted; and even of these they were on all occasions ready to run into it, as is evident from their history in the Old Testament. At the time of Christ's appearance, the religion of the Romans, as well as their empire, extended over a great part of the world. Some people there were among the heathens who perceived the absurdities of that system; but being destitute of means, as well as of abilities, to effect a reformation, matters went on in their old way. Though there were at that time various sects of philosophers, yet all of them proceeded upon false principles, and consequently could be of no service to the advancement or reformation of religion. Nay, some, among whom were the Epicureans and Academics, declared openly against every kind of religion whatever.

Two religions at this time flourished in Palestine, viz. The Jewish and Samaritan; between whose respective followers reigned the most violent hatred and contempt. The difference between them seems to have been chiefly about the place of worship; which the Jews would have to be in Jerusalem, and the Samaritans on Mount Gerizim. But though the Jews were certainly right as to this point, they had greatly corrupted their religion in other respects. They expected a Saviour indeed, but they mistook his character; imagining that he was to be a powerful and warlike prince, who should set them free from the Roman yoke, which they bore with the utmost impatience. They also imagined that the whole of religion consisted in observing the rites of Moses, and some others which they had added to them, without the least regard to what is commonly called *morality or virtue*;

52
State of religion at the appearance of Christ.

52
General account of the Heathen superstitions.

Ecclesi-
astical
History.

as is evident from the many charges our Saviour brings against the Pharisees, who had the greatest reputation for sanctity among the whole nation. To these corrupt and vicious principles they added several absurd and superstitious notions concerning the divine nature, invincible powers, magic, &c. which they had partly imbibed during the Babylonian captivity, and partly derived from their neighbours in Arabia, Syria, and Egypt. The principal sects among them were the *ESSENES* or *ELLENIANS*, *PHARISEES*, and *SAD- DUCCEES*. The Samaritans, according to the most general opinion had corrupted their religion still more than the Jews.

When the true religion was preached by the Saviour of mankind, it is not to be wondered at if he became on that account obnoxious to a people so deeply sunk in corruption and ignorance as the Jews then were. It is not here requisite to enter into the particulars of the doctrine advanced by him, or of the opposition he met with from the Jews; as a full account of these things, and likewise of the preaching of the gospel by the Apostles, may be found in the New Testament.—The rapid progress of the Christian religion, under these faithful and inspired ministers, soon alarmed the Jews, and raised various persecutions against its followers. The Jews, indeed, seem at first to have been every where the chief promoters of persecution; for we find that they officiously went from place to place, where-ever they heard of the increase of the gospel, and by their calumnies and false suggestions endeavoured to excite the people against the Apostles. The Heathens, however, though at first they shewed no very violent spirit of persecution against the Christians, soon came to hate them as much as the Jews themselves. Tacitus acquaints us with the causes of this hatred, when speaking of the first general persecution under Nero. That inhuman emperor having, as was supposed, set fire to the city of Rome, to avoid the imputation of this wickedness, transferred it on the Christians. Our author informs us that they were already abhorred on account of their many and enormous crimes. “The author of this name (*Christians*),” says he, “was *CHRIST*, who, in the reign of Tiberius, was executed under Pontius Pilate, procurator of Judæa. The pestilent superstition was for a while suppressed: but it revived again, and spread, not only over Judæa, where this evil was first broached; but reached Rome, whither from every quarter of the earth is constantly flowing whatever is hideous and abominable amongst men, and is there readily embraced and practised. First, therefore, were apprehended such as openly avowed themselves to be of that sect; then by them were discovered an immense multitude; and all were convicted, not of the crime of burning Rome, but of hatred and enmity to mankind. Their death and tortures were aggravated by cruel derision and sport; for they were either covered with the skins of wild beasts and torn in pieces by devouring dogs, or fastened to crosses, or wrapped up in combustible garments, that, when the day-light failed, they might, like torches, serve to dispel the darkness of the night. Hence, towards the miserable sufferers, however guilty and deserving the most exemplary punishment, compassion arose; seeing they were doomed to perish, not

with a view to the public good, but to gratify the cruelty of one man.”

That this account of Tacitus is downright misrepresentation and calumny, must be evident to every one who reads it. It is impossible that any person can be convicted of hatred and enmity to mankind, without specifying a number of facts by which this hatred shewed itself. The burning of Rome would indeed have been a very plain indication of enmity to mankind; but of this Tacitus himself clears them, and mentions no other crime of which they were guilty. It is probable, therefore, that the only reason of this charge against the Christians, was their absolute refusal to have any share in the Roman worship, or to countenance the absurd superstitions of Paganism in any degree.

The persecution under Nero was succeeded by another under Domitian, during which the Apostle John was banished to Patmos, where he saw the visions, and wrote the book called his *Revelation*, which completes the canon of Scripture. This persecution commenced in the 95th year of the Christian æra; and John is supposed to have wrote his Revelation the year after, or in the following one.

During the first century, the Christian religion spread over a great number of different countries; but as we have now no authentic records concerning the travels of the apostles, or the success which attended them in their ministry, it was impossible to determine how far the gospel was carried during this period. We are, however, assured, that even during this early period many corruptions were creeping in, the progress of which was with difficulty prevented even by the apostles themselves. Some corrupted their profession by a mixture of Judaism, others by mixing it with the oriental philosophy; while others were already attempting to deprive their brethren of liberty, setting themselves up as eminent pastors, in opposition even to the apostles, as we learn from the epistles of St Paul, and the third epistle of St John. Hence arose the sects of the Gnostics, Cerinthians, Nicolaitans, Nazarenes, Ebionites, &c. with which the church was troubled during this century.

Concerning the ceremonies and method of worship used by the Christians of the first century, it is impossible to say any thing with certainty. Neither is the church order, government, and discipline, during this period, ascertained with any degree of exactness. Each of those parties, therefore, which exist at this day, contends with the greatest earnestness for that particular mode of worship which they themselves have adopted, and some of the most bigotted would willingly monopolise the word *church* in such a manner as to exclude from all hope of salvation every one who is not attacked to their particular party. It doth not however appear that, excepting baptism, the Lord's supper, and anointing the sick with oil, any external ceremonies or symbols were properly of divine appointment. According to Dr Mosheim, “there are several circumstances which incline us to think, that the friends and apostles of our blessed Lord either tolerated through necessity, or appointed for wise reasons, many other external rites in various places. At the same time, we are not to imagine, that they ever conferred upon any person a perpetual, indelible, pontifical authority,

53.
Tacitus's
account of
the first
persecution
by Nero.

54
Second
persecution.

Ecclesi-
astical
History.

Ecclesiastical History.

Ecclesiastical History.

thority, or that they enjoined the same rites in all churches. We learn on the contrary, from authentic records, that the Christian worship was, from the beginning, celebrated in a different manner in different places; and that, no doubt, by the orders, or at least with the approbation, of the apostles and their disciples. In those early times, it was both wise and necessary to shew, in the establishment of outward forms of worship, some indulgence to the ancient opinions, manners, and laws, of the respective nations to whom the gospel was preached.

55
History of the second century.

The second century commences with the third year of the emperor Trajan. The Christians were still persecuted; but as the Roman emperors were for the most part of this century princes of a mild and moderate turn, they persecuted less violently than formerly. Marcus Aurelius, notwithstanding the clemency and philosophy for which he is so much celebrated, treated the Christians worse than Trajan, Adrian, or even Severus himself did, who was noted for his cruelty. This respite from rigorous persecution proved a very favourable circumstance for the spreading of the Christian religion; yet it is by no means easy to point out the particular countries through which it was diffused. We are, however, assured, that, in the second century, Christ was worshipped as God almost through the whole east; as also among the Germans, Spaniards, Celts, and many other nations: but which of them received the gospel in the first century, and which in the second, is a question unanswerable at this distance of time. The writers of this century attribute the rapid progress of Christianity chiefly to the extraordinary gifts that were imparted to the first Christians, and the miracles which were wrought at their command; without supposing that any part of the success ought to be ascribed to the intervention of human means, or secondary causes. Many of the moderns, however, are so far from being of this opinion, that they are willing either to deny the authenticity of all miracles said to have been wrought since the days of the apostles, or to ascribe them to the power of the devil. To enter into the particulars of this controversy is foreign to our present purpose; for which reason we must refer to the writers of polemic divinity, who have largely treated of this and other points of a similar nature.

56
Ceremonies multiplied.

The corruptions which had been introduced in the first century, and which were almost coeval with Christianity itself, continued to gain ground in the second. Ceremonies, in themselves futile and useless, but which must be considered as highly pernicious when joined to a religion incapable of any other ornament than the upright and virtuous conduct of its professors, were multiplied for no other purpose than to please the ignorant multitude. The immediate consequence of this was, that the attention of Christians was drawn aside from the important duties of morality; and they were led to imagine, that a careful observance of the ceremonies might make amends for the neglect of moral duties. This was the most pernicious opinion that could possibly be entertained; and was indeed the very foundation of that enormous system of ecclesiastical power which afterwards took place, and held the whole world in slavery and barbarism for many ages.

57
Myteries introduced.

Another mischief was the introduction of *myteries*, VOL. V.

as they were called, into the Christian religion; that is, insinuating, that some parts of the worship in common use had a hidden efficacy and power, far superior to the plain and obvious meaning assigned to them by the vulgar: and by paying peculiar respect to these *myteries*, the pretended teachers of the religion of Jesus accommodated their doctrines to the taste of their heathen neighbours, whose religion consisted in a heap of *myteries*, of which nobody knew the meaning.

By these, and other means of a similar kind, the Christian pastors greatly abridged the liberty of their flock. Being masters of the ceremonies and *myteries* of the Christian religion, they had it in their power to make their followers worship and believe whatever they thought proper, and this they did not fail to make use of for their own advantage. They persuaded the people, that the ministers of the Christian church succeeded to the character, rights, and privileges, of the Jewish priesthood; and accordingly, the bishops considered themselves as invested with a rank and character similar to those of the high-priest among the Jews, while the presbyters represented the priests, and the deacons the Levites. This notion, which was first introduced in the reign of Adrian, proved a source of very considerable honour and profit to the clergy.

58
The teachers assume a power over the people.

The form of ecclesiastical government was in this century rendered permanent and uniform. One inspector or bishop presided over each Christian assembly, to which office he was elected by the voices of the whole people. To assist him in his office, he formed a council of presbyters, which was not confined to any stated number. To the bishops and presbyters the ministers or deacons were subject; and the latter were divided into a variety of classes, as the different exigencies of the church required. During a great part of this century, the churches were independent of each other; nor were they joined together by association, confederacy, or any other bonds but those of charity. Each assembly was a little state governed by its own laws; which were either enacted, or at least approved of, by the society. But, in process of time, all the Christian churches of a province were formed into one large ecclesiastical body, which, like confederate states, assembled at certain times, in order to deliberate about the common interests of the whole. This institution had its origin among the Greeks; but in a short time it became universal, and similar assemblies were formed in all places where the gospel had been planted. These assemblies, which consisted of the deputies or commissioners from several churches, were called *synods* by the Greeks, and *councils* by the Latins; and the laws enacted in these general meetings were called *canons*, i. e. *rules*.

These councils, of which we find not the smallest trace before the middle of this century, changed the whole face of the church, and gave it a new form; for by them the ancient privileges of the people were considerably diminished, and the power and authority of the bishops greatly augmented. The humility indeed, and prudence, of these pious prelates hindered them from assuming all at once the power with which they were afterwards invested. At their first appearance in these general councils, they acknowledged that they were no more than the delegates of their respective churches,

59
Form of church government.

60
Changes produced by the institution of councils.

churches, and that they acted in the name and by the appointment of their people. But they soon changed this humble tone; imperceptibly extended the limits of their authority; turned their influence into dominion, their counsels into laws; and at length openly asserted, that Christ had empowered them to prescribe to his people *authoritative rules of faith and manners*. Another effect of these councils was the gradual abolition of that perfect equality which reigned among all bishops in the primitive times. For the order and decency of these assemblies required, that some one of the provincial bishops met in council should be invested with a superior degree of power and authority; and hence the rights of Metropolitans derive their origin. In the mean time, the bounds of the church were enlarged; the custom of holding councils was followed wherever the sound of the gospel had reached; and the universal church had now the appearance of one vast republic formed by a combination of a great number of little states. This occasioned the creation of a new order of ecclesiastics, who were appointed in different parts of the world as heads of the church, and whose office it was to preserve the confidence and union of that immense body, whose members were so widely dispersed throughout the nations. Such was the nature and office of the *Patriarchs*; among whom, at length, ambition, being arrived at its most insolent period, formed a new dignity, investing the bishop of Rome with the title and authority of the *prince of the patriarchs*.

62.
Account of
the Ascetic-
tics.

During the second century, all the sects continued which had sprung up in the first, with the addition of several others, the most remarkable of which were the *Ascetics*. These owed their rise to an error propagated by some doctores of the church, who asserted that Christ had established a *double rule of sanctity and virtue* for two different orders of Christians. Of these rules, one was ordinary, the other extraordinary; the one of a lower dignity, the other more sublime: the first for persons in the active scenes of life; the other for those who, in a sacred retreat, aspired after the glory of a celestial state. In consequence of this system, they divided into two parts all those moral doctrines and instructions, which they had received either by writing or tradition. One of these divisions they called *precepts*, and the other *counsels*. They gave the name of *precepts* to those laws that were universally obligatory upon all orders of men; and that of *counsels* to those which related to Christians of a more sublime rank, who proposed to themselves great and glorious ends, and breathed after an intimate communion with the Supreme Being.—Thus were produced all at once a new set of men, who made pretensions, to uncommon sanctity and virtue, and declared their resolution of obeying all the *precepts and counsels* of Christ, in order to their enjoyment of communion with God here; and also that, after the dissolution of their mortal bodies, they might ascend to him with the greater facility, and find nothing to retard their approach to the centre of happiness and perfection. They looked upon themselves as prohibited from the use of things which it was lawful for other Christians to enjoy, such as wine, flesh, matrimony, and commerce. They thought it their indispensable duty to extenuate their body by watchings, abstinence, labour,

and hunger. They looked for felicity in solitary retreats, and desert places; where, by severe and assiduous efforts of sublime meditation, they raised the soul above all external objects, and all sensual pleasures. They were distinguished from other Christians, not only by their title of *Ascetics*, *Ἐσκητικοί*, *Εσκητικοί*, and philosophers, but also by their garb. In this century, indeed, those who embraced such an austere kind of life, submitted themselves to all these mortifications in private, without breaking asunder their social bands, or withdrawing themselves from mankind; but in process of time they retired into deserts, and, after the example of the *Essenes* and *Therapeutæ*, they formed themselves into certain companies.

This austere sect arose from an opinion which has been more or less prevalent in all ages and in all countries, namely, That religion consists more in prayers, meditations, and a kind of secret intercourse with God, than in fulfilling the social duties of life in acts of benevolence and humanity to mankind. Nothing can be more evident than that the Scripture reckons the fulfilling of these infinitely superior to the observance of all the ceremonies that can be imagined; yet it somehow or other happens, that almost every body is more inclined to observe the ceremonial part of devotion, than the moral; and hence, according to the different humours or constitutions of different persons, there have been numberless forms of Christianity, and the most virulent contentions among those who professed themselves followers of the Prince of Peace. It is obvious, that if the moral conduct of Christians was to be made the standard of faith, instead of speculative opinions, all these divisions must cease in a moment; but while Christianity, or any part of it, is made to consist in speculation, or the observance of ceremonies, it is impossible there can be any end of sects or heresies. No opinion whatever is so absurd, but some people have pretended to argue in its defence; and no ceremony so insignificant, but it hath been explained and sanctified by hot-headed enthusiasts: and hence ceremonies, sects, and absurdities, have been multiplied without number, to the prejudice of society and of the Christian religion.—This short relation of the rise of the Ascetic sect will also serve to account for the rise of any other; so that we apprehend it is needless to enter into particulars concerning the rest, as they all took their origin from the same general principle variously modified, according to the different dispositions of mankind.

The Ascetic sect began first in Egypt, from whence it passed into Syria and the neighbouring countries. At length it reached the European nations: and hence that train of austere and superstitious vows and rites which totally obscured, or rather annihilated, Christianity; the celibacy of the clergy, and many other absurdities of the like kind.—The errors of the Ascetics, however, did not stop here. In compliance with the doctrines of some Pagan philosophers, they affirmed that it was not only lawful, but even praiseworthy to deceive, and to use the expedient of a lie, in order to advance the cause of piety and truth; and hence the *pious frauds* for which the church of Rome hath been so notorious, and with which she hath been so often and justly reproached.

As Christians thus deviated more and more from the

Ecclesiastical History.

63
Contests concerning festivals.

the true practice of their religion, they became more zealous in the external profession of it. Anniversary festivals were celebrated in commemoration of the death and resurrection of Christ, and of the effusion of the Holy Ghost on the apostles. Concerning the days on which these festivals were to be kept, there arose violent contests. The Asiatic churches in general differed in this point from those of Europe ; and towards the conclusion of the century, Victor, bishop of Rome, took it in his head to force the eastern churches to follow the rules laid down by the western ones. This they absolutely refused to comply with : upon which Victor cut them off from communion with the church of Rome ; though, by means of the intercession of some prudent people, the difference was made up for the present.

64
Third century.

During most of the third century, the Christians were allowed to enjoy their religion, such as it was, without molestation. The emperors Maximinus and Decius, indeed, made them feel all the rigours of a severe persecution ; but their reigns were short, and from the death of Decius to the time of Dioclesian the church enjoyed tranquillity. Thus vast multitudes were converted ; but at the same time, the doctrine grew daily more corrupt, and the lives of professed Christians more wicked and scandalous. New ceremonies were invented in great numbers, and an unaccountable passion now prevailed for the oriental superstitions concerning demons ; whence proceeded the whole train of exorcisms, spells, and fears for the apparition of evil spirits, which to this day are nowhere eradicated. Hence also the custom of avoiding all connections with those who were not baptized, or who lay under the penalty of excommunication, as persons supposed to be under the dominion of some evil spirit. And hence the rigour and severity of that discipline and penance imposed upon those who had incurred, by their immoralities, the censures of the church.—Several alterations were now made in the manner of celebrating the Lord's supper. The prayers used on this occasion were lengthened, and the solemnity and pomp with which it was attended were considerably increased. Gold and silver vessels were used in the celebration ; it was thought essential to salvation, and for that reason administered even to infants.—Baptism was celebrated twice a-year to such as, after a long course of trial and preparation, offered themselves candidates. The remission of sins was thought to be its immediate consequence ; while the bishop, by prayer and imposition of hands, was supposed to confer those sanctifying gifts of the Holy Ghost, that are necessary to a life of righteousness and virtue. An evil demon was supposed naturally to reside in every person, who was the author and source of all the corrupt dispositions and unrighteous actions of that person. The driving out of this demon was therefore an essential requisite for baptism ; and, in consequence of this opinion, the baptized persons returned home clothed in white garments, and adorned with crowns, as sacred emblems, the former of their inward purity and innocence, and the latter of their victory over sin and the world.—Fasting began now to be held in more esteem than formerly. A high degree of sanctity was attributed to this practice ; it was even looked upon as indispensably necessary, from a notion that the demons directed

their force chiefly against those who pampered themselves with delicious fare, and were less troublesome to the lean and hungry who lived under the severities of a rigorous abstinence.—The sign of the cross also was supposed to administer a victorious power over all sorts of trials and calamities ; and was more especially considered as the surest defence against the snares and stratagems of malignant spirits ; for which reason, no Christian undertook any thing of moment, without arming himself, as he imagined, with the power of this triumphant sign.—The heresies which troubled the church during this century, were the Gnostics, (whose doctrines were new-modelled and improved by Manes, from whom they were afterwards chiefly called *Manicheans*) ; the HIERACITES, NOETIANS, SABELLIANS, and NOVATIANS ; for a particular account of which, see those articles.

65
Fourth century.

The fourth century is remarkable for the establishment of Christianity by law in the Roman empire ; which, however, did not take place till the year 324. In the beginning of the century, the empire was governed by four chiefs, viz. Dioclesian, Maximian, Constantius Chlorus, and Galerius, under whom the church enjoyed a perfect toleration. Dioclesian, tho' much addicted to superstition, had no ill-will against the Christians ; and Constantius Chlorus, having abandoned polytheism, treated them with condescension and benevolence. This alarmed the Pagan priests, whose interests were so closely connected with the continuance of the ancient superstitions ; and who apprehended, not without reason, that the Christian religion would at length prevail throughout the empire. To prevent the downfall of the Pagan superstition, therefore, they applied to Dioclesian and Galerius Cæsar ; by whom a most bloody persecution was commenced in the year 303, and continued till 311. An asylum, however, was opened for the Christians in the year 304. Galerius having dethroned Dioclesian and Maximian, declared himself emperor in the east ; leaving all the western provinces, to which great numbers of Christians resorted to avoid the cruelty of the former, to Constantius Chlorus. At length Galerius, being overtaken with an incurable and dreadful disease, published an edict ordering the persecution to cease, and restoring freedom to the Christians, whom he had most inhumanly oppressed for eight years. Galerius died the same year : and in a short time after, when Constantine the Great ascended the throne, the Christians were freed from any farther uneasiness, by his abrogating all the penal laws against them ; and afterwards issuing edicts, by which no other religion than the Christian was tolerated throughout the empire.

66
Christianity established by Constantine.

This event however, so favourable to the outward peace of the church, was far from promoting its internal increase of harmony, or the reformation of its leaders. The clergy, who had all this time been augmenting their power at the expence of the liberty of the people, now set no bounds to their ambition. The bishop of Rome was the first in rank, and distinguished by a sort of pre-eminence above the rest of the prelates. He surpassed all his brethren in the magnificence and splendor of the church over which he presided ; in the riches of his revenues and possessions ; in the number and variety of his ministers ; in his credit with the people, and in his sumptuous

67
Increase of internal corruptions.

and splendid manner of living. Hence it happened that when a new pontiff was to be chosen by the presbyters and people, the city of Rome was generally agitated with dissensions, tumults, and cabals, which often produced fatal consequences. The intrigues and disturbances which prevailed in that city in the year 366, when, upon the death of Liberius, another pontiff was to be chosen in his place, are a sufficient proof of what we have advanced. Upon this occasion, one faction elected Damasus to that high dignity; while the opposite party chose Ursicinus, a deacon of the vacant church, to succeed Liberius. This double election gave rise to a dangerous schism, and to a sort of civil war within the city of Rome; which was carried on with the utmost barbarity and fury, and produced the most cruel massacres and desolations. The inhuman contest ended in the victory of Damasus; but whether his cause was more just than that of Ursicinus, is not so easily determined.

Notwithstanding the pomp and splendor which surrounded the Roman see, it is certain that the bishops of Rome had not yet acquired that pre-eminence of power and jurisdiction which they afterwards enjoyed. In the ecclesiastical commonwealth, indeed, they were the most eminent order of citizens; but still they were citizens as well as their brethren, and subject, like them, to the laws and edicts of the emperors. All religious causes of extraordinary importance were examined and determined, either by judges appointed by the emperors, or in councils assembled for that purpose; while those of inferior moment were decided in each district by its respective bishop. The ecclesiastical laws were enacted either by the emperor or councils. None of the bishops acknowledged that they derived their authority from the permission and appointment of the bishop of Rome, or that they were created bishops by the favour of the *apostolic see*. On the contrary, they all maintained that they were the ambassadors and ministers of Jesus Christ, and that their authority was derived from above. It must, however, be observed, that even in this century, several of those steps were laid, by which the bishops of Rome mounted afterwards to the summit of ecclesiastical power and despotism. This happened partly by the imprudence of the emperors, partly by the dexterity of the Roman prelates themselves, and partly by the inconsiderate zeal and precipitate judgment of certain bishops.—The imprudence of the emperor, and precipitation of the bishops, were remarkably discovered in the following event, which favoured extremely the ambition of the Roman pontiff. About the year 372, Valentinian enacted a law, empowering the bishop of Rome to examine and judge other bishops, that religious disputes might not be decided by any profane or secular judges. The bishops, assembled in council at Rome in 378, not considering the fatal consequences that must arise from this imprudent law both to themselves and to the church, declared their approbation in the strongest terms, and recommended the execution of it in their address to the emperor Gratian. Some think, indeed, that this law empowered the Roman bishop to judge only the bishops within the limits of his jurisdiction; others, that his power was given only for a certain time, and for a particular purpose. This last notion seems the most probable;

but still this privilege must have been an excellent instrument in the hands of sacerdotal ambition.

By the removal of the seat of empire to Constantinople, the emperor raised up, in the bishop of this new metropolis, a formidable opponent to the bishop of Rome, and a bulwark which threatened a vigorous opposition to his growing authority. For as the emperor, in order to render Constantinople a second Rome, enriched it with all the rights and privileges, honours and ornaments, of the ancient capital of the world; so its bishop, measuring his own dignity and rank by the magnificence of the new city, and its eminence as the residence of the emperor, assumed an equal degree of dignity with the bishop of Rome, and claimed a superiority over the rest of the episcopal order. Nor did the emperors disapprove of these high pretensions, since they considered their own dignity as connected in a certain measure with that of the bishop of their imperial city. Accordingly, in a council held at Constantinople, in the year 381, by the authority of Theodosius the Great, the bishop of that city was, during the absence of the bishop of Alexandria, and against the consent of the Roman prelate, placed by the third canon of that council in the first rank after the bishop of Rome, and consequently above those of Alexandria and Antioch. Nestarius was the first bishop who enjoyed these new honours accumulated upon the see of Constantinople. His successor, the celebrated John Chrysostom, extended still farther the privileges of that see, and submitted to its jurisdiction all Thrace, Asia, and Pontus; nor were the succeeding bishops of that imperial city destitute of a fervent zeal to augment their privileges, and extend their dominion. By this unexpected promotion, the most disagreeable effects were produced. The bishops of Alexandria were not only filled with the most inveterate hatred against those of Constantinople, but a contention was excited between the bishops of Rome and Constantinople; which, after being carried on for many ages, concluded at last in the separation of the Greek and Latin churches.

Constantine the Great, in order to prevent civil commotions, and to fix his authority on a stable and solid foundation, made several changes not only in the laws of the empire, but also in the form of the Roman government. And as there were many important reasons which induced him to suit the administration of the church to these changes in the civil constitution, this necessarily introduced among the bishops new degrees of eminence and rank. The four bishops, of Rome, Constantinople, Antioch, and Alexandria, were distinguished by a certain degree of pre-eminence over the rest. These four prelates answered to the four praetorian prefects created by Constantine; and it is possible, that even in this century they were distinguished by the Jewish title of *patriarchs*. After these followed the *exarchs*, who had the inspection over several provinces, and answered to the appointment of certain civil officers who bore the same title. In a lower class were the *metropolitans*, who had only the government of one province; under whom were the *archbishops*, whose inspection was confined to certain districts. In this gradation the bishops brought up the rear; but the sphere of their authority was not in all places equally extensive; being in some considerably ample, and in others con-

69
Form of
church-gov-
ernment
established
by Con-
stantine.

finend

lined within narrow limits. To these various ecclesiastical orders we might add that of the *chorepiscopi*, or superintendants of the country-churches; but this last order was in most places suppressed by the bishops, with a design to extend their own authority, and enlarge the sphere of their power and jurisdiction. The administration of the church itself was divided by Constantine into an *external* and *internal* inspection. The latter, which was committed to bishops and councils, related to religious controversies, the forms of divine worship, the offices of priests, the vices of the ecclesiastical orders, &c. The external administration of the church the emperor assumed to himself. This comprehended all those things which related to the outward state and discipline of the church; it likewise extended to all contests that should arise between the ministers of the church, superior as well as inferior, concerning their possessions, their reputation, their rights and privileges, their offences against the laws, &c. but no controversies that related to matters purely spiritual were cognisable by this external inspection. In consequence of this artful division of the ecclesiastical government, Constantine and his successors called councils, presided in them, appointed the judges of religious controversies, terminated the differences which arose between the bishops and the people, fixed the limits of the ecclesiastical provinces, took cognizance of the civil causes that subsisted between the ministers of the church, and punished the crimes committed against the laws by the ordinary judges appointed for that purpose; giving over all causes purely ecclesiastical to the bishops and councils. But this famous division of the administration of the church was never explained with sufficient accuracy; so that, both in the fourth and fifth centuries, there are frequent instances of the emperors determining matters purely ecclesiastical, and likewise of bishops and councils determining matters which related merely to the external form and government of the church.

After the time of Constantine many additions were made by the emperors and others to the wealth and honours of the clergy; and these additions were followed by a proportionable increase of their vices and luxury, particularly among those who lived in great and opulent cities. The bishops, on the one hand, contended with each other in the most scandalous manner concerning the extent of their respective jurisdictions; while, on the other, they trampled on the rights of the people, violated the privileges of the inferior ministers, and imitated in their conduct and in their manner of living the arrogance, voluptuousness, and luxury of magistrates and princes. This pernicious example was soon followed by the several ecclesiastical orders. The presbyters, in many places, assumed an equality with the bishops in point of rank and authority. Many complaints are also made by the authors of this century about the vanity and effeminacy of the deacons. Those more particularly of the presbyters and deacons who filled the first stations of these orders, carried their pretensions to an extravagant length, and were offended at the notion of being placed on an equality with their colleagues. For this reason they not only assumed the titles of *arch-presbyters*; and *arch-deacons*, but also claimed a degree of authority and power much superior to that which was vested in the other members

of their respective orders.

In the fifth century, the bishops of Constantinople having already reduced under their jurisdiction all the Asiatic provinces, began to grasp at still further accessions of power. By the 28th canon of the council held at Chalcedon in 451, it was resolved, that the same rights and honours which had been conferred on the bishop of Rome were due to the bishop of Constantinople, on account of the equal dignity and lustre of the two cities in which these prelates exercised their authority. The same council confirmed also, by a solemn act, the bishop of Constantinople in the spiritual government of those provinces over which he had usurped the jurisdiction. Leo the Great, bishop of Rome, opposed with vehemence the passing of these laws; and his opposition was seconded by that of several other prelates. But their efforts were vain, as the emperors threw in their weight into the balance, and thus supported the decisions of the Grecian bishops. In consequence, then, of the decisions of this famous council, the bishop of Constantinople began to contend obstinately for the supremacy with the Roman pontiff, and to crush the bishops of Antioch and Alexandria. About the same time, Juvenal, bishop of Jerusalem, attempted to withdraw himself and his church from the jurisdiction of the bishop of Cæsarea, and aspired after a place among the first prelates of the Christian world. The high degree of veneration and esteem in which the church of Jerusalem was held among all other Christian societies (on account of its rank among the apostolical churches, and its title to the appellation of *mother-church*, as having succeeded the first Christian assembly formed by the Apostles), was extremely favourable to the ambition of Juvenal, and rendered his project much more practicable than it would otherwise have been. Encouraged by this, and likewise by the protection of Theodosius the younger, this aspiring prelate not only assumed the dignity of patriarch of all Palestine, a rank which rendered him independent of all spiritual authority; but also invaded the rights of the bishop of Antioch, and usurped his jurisdiction over the provinces of Phœnicia and Arabia. Hence arose a warm contest between Juvenal and Maximus bishop of Antioch; which the council of Chalcedon decided, by restoring to the latter the provinces of Phœnicia and Arabia, and confirming the former in the spiritual possession of all Palestine and in the high rank which he had assumed in the church.

In 588, John, bishop of Constantinople, furnished the *Foster*, either by his own authority or that of the emperor Mauritius, summoned a council at Constantinople to inquire into an accusation brought against Gregory, bishop of Antioch; and upon this occasion assumed the title of *oecumenical* or *universal bishop*. This title had been formerly enjoyed by the bishops of Constantinople without any offence; but now, Gregory the Great, at that time bishop of Rome, suspecting that John was aiming at the supremacy over all the churches, opposed his claim with the greatest vigour. For this purpose he applied by letters to the emperor, and others, whom he thought capable of assisting him in his opposition: but all his efforts were without effect; and the bishops of Constantinople were allowed to enjoy the disputed title, though not in the sense which had alarmed the Roman pontiff.

Gregory.

71
Contests between the bishops of Rome and Constantinople.

70
Scandalous lives of the clergy.

Gregory, however, adhered tenaciously to his purpose, raised new tumults and dissensions among the clergy, and aimed at nothing less than an unlimited supremacy over the Christian church. This ambitious design succeeded in the West; while, in the Eastern provinces, his arrogant pretensions were scarcely respected by any but those who were at enmity with the bishop of Constantinople. How much the people were at this time deluded by the Roman pontiffs, appears from the expression of Ennodius, one of the flatterers of Symmachus, (who was a prelate of but ambiguous fame) that the Roman pontiff was constituted *judge in the place of God*, which he filled as the viceregent of the most high. On the other hand it is certain, from a variety of the most authentic records, that both the emperors and the nations in general, were far from being disposed to bear with patience the yoke of servitude which the see of Rome was arrogantly imposing on the whole church.

72
Origin of the supremacy of the pope.

In the beginning of the seventh century, according to the most learned historians, Boniface III. engaged Phocas, emperor of Constantinople, to take from the bishop of that metropolis, the title of *apostolical or universal bishop*, and to confer it upon the Roman pontiff; and thus was first introduced the supremacy of the pope. The Roman pontiffs used all methods to maintain and enlarge this authority and pre-eminence which they had acquired from one of the most odious tyrants that ever disgraced the annals of history.

In the eighth century, the power of the bishop of Rome, and of the clergy in general, increased prodigiously. The chief cause of this, besides the superstition of the people, was the method at that time used by the European princes to secure themselves on their thrones. All these princes being then employed either in usurpation or in self-defence, and the whole continent being in the most unsettled and barbarous condition, they endeavoured to attach warmly to their interests those whom they considered as their friends and clients. For this purpose they distributed among them extensive territories, cities, and fortresses, with the various rights and privileges belonging to them; reserving only to themselves the supreme dominion, and the military service of these powerful vassals. For this reason it was by the European princes reckoned a high instance of political prudence to distribute among the bishops and other Christian doctors the same sort of donations which had formerly been given to their generals and clients. By means of the clergy, they hoped to check the seditious and turbulent spirits of their vassals, and to maintain them in their obedience by the influence and authority of their bishops, whose commands were highly respected, and whose spiritual thunderbolts, rendered formidable by ignorance, struck terror into the boldest and most resolute hearts.

This prodigious accession to the opulence and authority of the clergy in the west, began at their head, viz. the Roman pontiff; from whence it spread gradually among the inferior sacerdotal orders. The barbarous nations who had received the gospel, looked upon the bishop of Rome as the successor of their chief druid or high priest: and as this tremendous druid had enjoyed, under the darkness of Paganism, a kind of boundless authority; so these barbarous nations thought proper to confer upon the chief bi-

shop, the same authority which had belonged to the chief druid. The Pope received these august privileges with great pleasure; and left, upon any change of affairs, attempts should be made to deprive him of them, he strengthened his title to these extraordinary honours by a variety of passages drawn from ancient history, and, what is still more astonishing, by arguments of a religious nature. This swelled the Roman druid to an enormous size; and gave to the see of Rome that high pre-eminence and despotic authority in civil and political matters, that were unknown to former ages. Hence, among other unhappy circumstances, arose that monstrous and pernicious opinion, that such persons as were excluded from the communion of the church by the pontiff himself, or any of the bishops, forfeited thereby, not only their civil rights and advantages as citizens, but even the common claims and privileges of humanity. This horrid opinion, which was a fatal source of wars, massacres, and rebellions, without number, and which contributed more than any thing else to confirm and augment the papal authority, was borrowed by the clergy from the Pagan superstitions.—Though excommunication, from the time of Constantine the Great, was in every part of the Christian world attended with many disagreeable effects; yet its highest terrors were confined to Europe, where its aspect was truly formidable and hideous. It acquired also, in the eighth century, new accessions of terror; so that from that period the excommunication practised in Europe differed entirely from that which was in use in other parts of Christendom. Excommunicated persons were indeed considered in all places as objects of hatred both to God and man: but they were not, on that account, robbed of the privileges of citizens, nor of the rights of humanity; much less were those kings and princes, whom an insolent bishop had thought proper to exclude from the communion of the church, supposed to forfeit on that account their crowns or their territories. But from this century it was quite otherwise in Europe. Excommunication received that infernal power which dissolved all connections; so that those whom the bishops, or their chief, excluded from church communion, were degraded to a level with the beasts. The origin of this unnatural and horrid power was as follows. On the conversion of the barbarous nations to Christianity, these ignorant proselytes confounded the excommunication in use among Christians with that which had been practised in the times of Paganism, and which was attended with all the dreadful effects above-mentioned. The Roman pontiffs, on the other hand, were too artful not to encourage this error; and therefore employed all sorts of means to gain credit to an opinion so well calculated to gratify their ambition, and to aggrandize in general the episcopal order.

The annals of the French nation furnish us with the following instance of the enormous power which was at this time vested in the Roman pontiff. Pepin, who was mayor of the palace to Childeric III. king of France, and who in the exercise of that high office was possessed in reality of the royal power and authority, aspired to the titles and honours of majesty also, and formed a scheme of dethroning his sovereign. For this purpose he assembled the states in 751; and though

73
He becomes a temporal prince.

Ecclesi-
astical
History.

though they were devoted to the interests of this ambitious usurper, they gave it as their opinion that the bishop Rome was previously to be consulted whether the execution of such a scheme was lawful or not. In consequence of this, ambassadors were sent by Pepin to Zachary, the reigning pontiff, with the following question, "Whether the divine law did not permit a valiant and warlike people to dethrone a pusillanimous and indolent prince who was incapable of discharging any of the functions of royalty; and to substitute in his place one more worthy to rule, and who had already rendered most important services to the state?" The situation of Zachary, who stood much in need of the succours of Pepin against the Greeks and Lombards, rendered his answer such as the usurper desired: and when this favourable decision of the Roman oracle was published in France, the unhappy Childeric was stripped of his royalty without the least opposition; and Pepin, without the smallest resistance, stepped into the throne of his master and his sovereign. This decision was solemnly confirmed by Stephen II, the successor of Zachary; who undertook a journey into France in the year 754, in order to solicit assistance against the Lombards. The pontiff at the same time dissolved the obligation of the oath of fidelity and allegiance which Pepin had sworn to Childeric and violated by his usurpation in the year 751; and to render his title to the crown as sacred as possible, Stephen anointed and crowned him, with his wife and two sons, for the second time. This complaisance of the Pope was rewarded with the exarchate of Ravenna and all its dependencies, as we have already related. See CIVIL HISTORY, n^o 44; and *History of ITALY*.

In the succeeding centuries, the Roman pontiffs continued to increase their power by every kind of artifice and fraud which can dishonour the heart of man; and, by continually taking advantages of the civil dissensions which prevailed throughout Italy, France, and Germany, their influence in civil affairs arose to an enormous height. The increase of their authority in religious matters was not less rapid. The wisest and most impartial among the Roman Catholic writers acknowledge, that, from the time of Lewis the Meek, the ancient rules of ecclesiastical government were gradually changed in Europe by the counsels and instigation of the church of Rome, and new laws substituted in their place. The European princes suffered themselves to be divested of the supreme authority in religious matters which they had derived from Chaulmagne; the power of the bishops was greatly diminished, and even the authority of both provincial and general councils began to decline. The popes, elated with their overgrown prosperity, and become arrogant beyond measure by the daily accessions that were made to their authority, were eagerly bent upon establishing the maxim, That the bishop of Rome was constituted and appointed by Jesus Christ, supreme legislator and judge of the church universal; and that therefore the bishops derived all their authority from him. This opinion, which they inculcated with the utmost zeal and ardour, was opposed in vain by such as were acquainted with the ancient ecclesiastical constitutions, and the government of the church in the earlier ages. In order to gain credit to this new ecclesiastical code, and to support the preten-

sions of the popes to supremacy, it was necessary to produce the authority of ancient deeds, in order to stop the mouths of such as were disposed to set bounds to their usurpations. The bishops of Rome were aware of this; and as those means were looked upon as the most lawful that tended best to the accomplishment of their purposes, they employed some of their most ingenious and zealous partisans in forging conventions, acts of councils, epistles, and such-like records, by which it might appear, that, in the first ages of the church, the Roman pontiffs were clothed with the same spiritual majesty and supreme authority which they now assumed. There were not, however, wanting among the bishops some men of prudence and sagacity, who saw through these impious frauds, and perceived the chains that were forging both for them and the church. The French bishops distinguished themselves eminently in this respect: but their opposition was soon quashed; and as all Europe was sunk in the grossest ignorance and darkness, none remained who were capable of detecting these odious impollutes, or disposed to support the expiring liberty of the church.

This may serve as a general specimen of the characters and behaviour of the pretended viceregents of Jesus Christ, to the 16th century. In the 11th century indeed, their power seems to have risen to its utmost height. They now received the pompous titles of *Masters of the world*, and *Popes*, i. e. *Universal Fathers*. They presided every where in the councils by their legates, assumed the authority of supreme arbiters in all controversies that arose concerning religion or church-discipline, and maintained the pretended rights of the church against the encroachments and usurpations of kings and princes. Their authority, however, was confined within certain limits: for, on the one hand, it was restrained by sovereign princes, that it might not arrogantly aim at civil dominion; and on the other, it was opposed by the bishops themselves, that it might not arise to a spiritual despotism, and utterly destroy the privileges and liberty of synods and councils. From the time of Leo IX. the popes employed every method which the most artful ambition could suggest to remove those limits, and to render their dominion both despotic and universal. They not only aspired to the character of supreme legislators in the church, to an unlimited jurisdiction over all synods and councils whether general or provincial, to the sole distribution of all ecclesiastical honours and benefices; as divinely authorized and appointed for that purpose; but they carried their insolent pretensions so far, as to give themselves out for lords of the universe, arbiters of the fate of kingdoms and empires, and supreme rulers over the kings and princes of the earth. Hence we find instances of their giving away kingdoms, and loosing subjects from their allegiance to their sovereigns, among which the history of John king of England is very remarkable. At last, they plainly assumed the whole earth as their property, as well where Christianity was preached as where it was not; and therefore, on the discovery of America and the East Indies, the pope, by virtue of this spiritual property, granted to the Portuguese a right to all the countries lying eastward, and to the Spaniards all those lying to the westward of Cape Non in Africa, which they were able to conquer by force of arms; and that nothing might be wanting

75
Extreme
influence
of the
popes.

to

74
His power
still increas-
es.

Ecclesi-
astical
History.

to complete their character, they pretended to be lords of the future world also, and to have a power of restraining even the Divine Justice itself, and remitting that punishment which the Deity hath denounced against the workers of iniquity.

76
Christianity
greatly cor-
rupted.

Invocations
of saints,
relics, pur-
gatory, &c.
introduced.

All this time, the powers of superstition reigned triumphant over those remains of Christianity which had escaped the corruptions of the first four centuries. In the fifth century began the invocation of the happy souls of departed saints. Their assistance was in-creased by many fervent prayers, while none stood up to oppose this preposterous kind of worship. The images of those who during their lives had acquired the reputation of uncommon sanctity, were now honoured with a particular worship in several places; and many imagined that this drew into the images the propitious presence of the saints or celestial beings which they were supposed to represent. A singular and irresistible efficacy was attributed to the bones of martyrs, and to the figure of the cross, in defeating all the attempts of Satan, removing all sorts of calamities, and in healing not only the diseases of the body, but also those of the mind. The famous Pagan doctrine concerning the *purgation of departed souls*, by means of a certain kind of fire, *i. e.* purgatory, was also confirmed and explained more fully than it had formerly been; and every one knows of how much consequence this absurd doctrine hath been to the wealth and power of the Ro-mish clergy.

77
Introduc-
tion of the
mass.

In the sixth century, Gregory the Great advanced an opinion, That all the *words* of the sacred writings were *images* of invisible and spiritual things; for which reason he loaded the churches with a multitude of ceremonies the most insignificant and futile that can be imagined; and hence arose a new and most difficult science, namely, the explication of these ceremonies, and the investigation of the causes and circumstances whence they derived their origin. A new method was contrived of administering the Lord's supper, with a magnificent assemblage of pompous ceremonies. This was called the *canon of the mass*. Baptism, except in cases of necessity, was administered only on the great festivals. An incredible number of temples were erected in honour of the saints. The places set apart for public worship were also very numerous; but now they were considered as the means of purchasing the protection and favour of the saints; and the ignorant and barbarous multitude were persuaded, that these departed spirits defended and guarded against evils and calamities of every kind, the provinces, lands, cities, and villages in which they were honoured with temples. The number of these temples was almost equalled by that of the festivals, which seem to have been invented in order to bring the Christian religion as near the model of Paganism as possible.

78
Supersti-
tion still
increases.

In the seventh century, religion seemed to be alto-gether buried under a heap of superstitious ceremonies; the worship of the true God and Saviour of the world was exchanged for the worship of bones, bits of wood (said to be of the cross), and the images of saints. The eternal state of misery threatened in Scripture to the wicked was exchanged for the temporary punish-ment of purgatory; and the expressions of faith in Christ by an upright and virtuous conduct, for the aug-mentation of the riches of the clergy by donations to

the church, and the observance of a heap of idle cere-monies. New festivals were still added; one in par-ticular was instituted in honour of the *true cross* on which our Saviour suffered; and churches were declared to be sanctuaries to all such as fled to them, whatever their crimes might have been.

Superstition, it would seem, had now attained its highest pitch; nor is it easy to conceive a degree of ig-norance and degeneracy beyond what we have already mentioned. If any thing can possibly be imagined more contrary to true religion, it is an opinion which prevailed in the eighth century, namely, That Chris-tians might appease an offended Deity by voluntary acts of mortification, or by gifts and oblations lavished on the church, and that people ought to place their confidence in the works and merits of the saints. The piety in this and some succeeding ages consisted in building and embellishing churches and chapels; in en-dowing monasteries and basilics; hunting after the re-lics of saints and martyrs, and treating them with an absurd and excessive veneration; in procuring the in-tercession of the saints by rich oblations, or super-stitious rites; in worshipping images; in pilgrimages to those places where they were esteemed holy, particu-larly to Palestine, &c. The genuine religion of Jes-us was now utterly unknown, both to clergy and people, if we except a few of its general doctrines con-tained in the creed. In this century also, the super-stitious custom of *solitary masses* had its origin. These were celebrated by the priest alone in behalf of souls detained in purgatory, as well as upon some other oc-casions. They were prohibited by the laws of the church, but proved a source of immense wealth to the clergy. Under Charlemagne they were condemned by a synod assembled at Mentz, as criminal effects of avarice and sloth. A new superstition, however, still sprung up in the tenth century. It was imagined, from Rev. xx. 1. that Antichrist was to make his appear-ance on the earth, that soon after the world itself would be destroyed. An universal panic ensued; vast num-bers of people, abandoning all their connections in so-ciety, and giving over to the churches and monasteries all their worldly effects, repaired to Palestine, where they imagined that Christ would descend from heaven to judge the world. Others devoted themselves by a solemn and voluntary oath to the service of the churches, convents, and priories, whose slaves they became, in the most rigorous sense of that word, performing daily their heavy tasks; and all this from a notion that the supreme Judge would diminish the severity of their sentence, and look upon them with a more favourable and propitious eye, on account of their having made themselves the slaves of his ministers. When an eclipse of the sun or moon happened to be visible, the cities were deserted, and their miserable inhabitants fled for refuge to hollow caverns, and hid themselves among the craggy rocks, and under the bending summits of steep mountains. The opulent attempted to bribe the saints and the Deity himself by rich donations conferred upon the sacerdotal tribe, who were looked upon as the immediate vicegerents of heaven. In many places, temples, palaces, and noble edifices both pub-lic and private, were suffered to decay, nay, were delib-erately pulled down, from a notion that they were no longer of any use, as the final dissolution of all things

Ecclesi-
astical

History

Ecclesiastical History.

Ecclesiastical History.

was at hand. In a word, no language is sufficient to express the confusion and despair that tormented the minds of miserable mortals upon this occasion. The general delusion was indeed opposed and combated by the discerning few, who endeavoured to dispel these terrors, and to efface the notion from which they arose in the minds of the people. But their attempts were ineffectual; nor could the dreadful apprehensions of the superstitious multitude be removed before the end of the century, and this terror became one of the accidental causes of the *CRUSADES*.

That nothing might now be wanting to complete that Antichristian system of religion which had over-spread all Europe, it was in the 11th century determined that divine worship should be celebrated in the Latin tongue, though now unknown throughout the whole continent. During the whole of this century also, Christians were employed in the rebuilding and ornamenting their churches, which they had destroyed through the superstitious fear already taken notice of.

In much the same way with what is above related, or worse if possible, matters went on till the time of the reformation. The clergy were immer-sed in crimes of the deepest dye; and the laity, imagining themselves able to purchase pardon of their sins for money, followed the examples of their pastors without remorse. The absurd principle formerly mentioned, namely, that religion consists in acts of austerity, and an unknown mental correspondence with God, produced the most extravagant and ridiculous behaviour in the devotees and reputed saints. They not only lived among the wild beasts, but also after the manner of these savage animals: they ran naked through the lonely deserts with a furious aspect, and all the agitations of madness and frenzy; they prolonged their wretched life by grass and wild herbs, avoided the sight and conversation of men, remained motionless in certain places for several years exposed to the rigour and inclemency of the seasons, and towards the conclusion of their lives shut themselves up in narrow and miserable huts; and all this was considered as true piety, the only acceptable method of worshipping the Deity and attaining a share in his favour.—But of all the instances of superstitious frenzy which disgraced the times we now speak of, none was held in higher veneration, or excited more the wonder of the multitude, than that of a certain order of men who were called *Stilitæ* by the Greeks, and *Sancti Colum-nares*, or Pillar-Saints, by the Latins. These were persons of a most singular and extravagant turn of mind, who stood motionless on the tops of pillars expressly raised for this exercise of their patience, and remained there for several years amidst the admiration and applause of the stupid populace. The inventor of this strange discipline was one *Simon* a Syrian, who began his follies by changing the agreeable employment of a shepherd for the austerities of a monkish life. He began his devotions on the top of a pillar six cubits high; but as he increased in sanctity, he also increased the height of his pillar, till, towards the conclusion of his life, he had got up on the top of a pillar 40 cubits in height. Many of the inhabitants of Syria and Palestine, seduced by a false ambition and an utter ignorance of true religion, followed the example of this fanatic,

Vol. V.

though not with the same degree of austerity. This superstitious practice began in the fifth century, and continued in the east for 600 years. The Latins, however, had too much wisdom and prudence to imitate the Syrians and Orientals in this whimsical superstition; and when a certain fanatic, or impostor, named *Wulfilaicus*, erected one of these pillars in the country of Treves, and proposed to live on it after the manner of *Simeon*, the neighbouring bishops ordered it to be pulled down.

The practices of austere worship and discipline in other respects, however, gained ground throughout all parts of Christendom. Monks of various kinds were to be found in every country in prodigious numbers. But though their discipline was at first exceedingly severe, it became gradually relaxed, and the monks gave into all the prevailing vices of the times. Other orders succeeded, who pretended to still greater degrees of sanctity, and to reform the abuses of the preceding ones; but these in their turn became corrupted, and fell into the same vices they had blamed in others. The most violent animosities, disputes, and hatred, also reigned among the different orders of monks; and, indeed, between the clergy of all ranks and degrees, whether we consider them as classed in different bodies, or as individuals of the same body. To enter into a detail of their wranglings and disputes, the methods which each of them took to aggrandise themselves at the expense of their neighbours, and to keep the rest of mankind in subjection, would require many volumes. We shall only observe, therefore, that even the external profession of the austere and absurd piety which took place in the fourth and fifth centuries, continued gradually to decline. Some there were, indeed, who boldly opposed the torrent of superstition and wickedness, which threatened to overflow the whole world: but their opposition proved fruitless, and all of these towards the era of the reformation had been either silenced or destroyed: so that, at that time, the pope and clergy reigned over mankind without controul, had made themselves masters of almost all the wealth in every country of Europe, and may truly be said to have been the only *sovereigns*; the rest of the human race, even kings and princes, being only their vassals and slaves.

While the Popish superstition reigned thus violent-ly in the west, the absurd doctrines of Mahomet over-spread all the east. The rise of this impostor is related under the article ARABIA. His successors conquered in order to establish the religion of their apostle; and thus the very name of Christianity was extinguished in many places where it had formerly flourished. The conquests of the Tartars having intermingled them with the Mahometans, they greedily embraced the superstitions of that religion, which thus almost entirely overspread the whole continents of Asia and Africa; and, by the conquest of Constantinople by the Turks in 1453, was likewise established throughout a considerable part of Europe.

About the beginning of the 16th century, the Roman pontiffs lived in the utmost tranquillity; nor had they, according to the appearance of things at that time, any reason to fear an opposition to their authority in any respect, since the commotions which had

81
State of religion in the beginning of the 16th century and since that time.

been raised by the Waldenses, Albigenses, &c. were now entirely suppressed. We must not, however, conclude, from this apparent tranquillity and security of the pontiffs and their adherents, that their measures were universally applauded. Not only private persons, but also the most powerful princes and sovereign states, exclaimed loudly against the tyranny of the popes, and the unbridled licentiousness of the clergy of all denominations. They demanded, therefore, a reformation of the church in its head and members, and a general council to accomplish that necessary purpose. But these complaints and demands were not carried to such a length as to produce any good effect; since they came from persons who never entertained the least doubt about the supreme authority of the pope in religious matters, and who of consequence, instead of attempting themselves to bring about that reformation which was so ardently desired, remained entirely inactive, or looked for redress to the court of Rome, or to a general council. But while the so much desired reformation seemed to be at such a great distance, it suddenly arose from a quarter whence it was not at all expected. A single person, Martin Luther, a monk of the order of St Augustine, ventured to oppose himself to the whole torrent of papal power and despotism. This bold attempt was first made public on the 30th of September 1517; and notwithstanding all the efforts of the Pope and his adherents, the doctrines of Luther continued daily to gain ground. Others, encouraged by his success, lent their assistance in the work of Reformation; which at last produced new churches, founded upon principles quite different from that of Rome, and which still continue. But for a particular account of the transactions of the first Reformers, the opposition they met with, and the final settlement of the reformed churches in different nations in Europe, see the articles LUTHER and REFORMATION.

The state of religion in other parts of the world seems as yet to be but little altered. Asia and Africa are sunk in the grossest superstitions either of the Mahomedan or Pagan kinds. The southern continent of America belonging to the Spaniards, continues immersed in the most absurd superstitions of Popery. The northern continent, being mostly peopled with colonies from Great Britain, professes the reformed religion. At the same time it must be owned, that some kind of reformation hath taken place even in Popery and Mahomedanism themselves. The Popes have no longer that authority over states and princes, even those most bigotted to Popery, which they formerly had. Neither are the lives either of the clergy or laity so corrupt as they were before. The increase of learning in all parts of the world hath contributed to cause men open their eyes to the light of reason, and this hath been attended with a proportional decrease of superstition. Even in Mahomedan countries, that furious enthusiasm which formerly emboldened the inhabitants to face the greatest dangers, hath now almost vanished; so that the credit of Mahomet himself seems to have sunk much in the estimation of his followers. This is to be understood even of the most ignorant and bigotted multitude; and the sensible part of the Turks are said to incline much towards Deism. With regard to those nations which still pro-

fect Paganism, the intercourse of Europeans with them is so small, that it is impossible to say any thing concerning them. As none of them are in a state of civilization, however, it may be conjectured, that their religion is of the same unpolished cast with their manners, and that it consists of a heap of barbarous superstitions which have been handed down among them from time immemorial, and which they continue to observe without knowing why or wherefore.

SECT. III. *Of the Composition of History.*

CICERO has given us the whole art of composing history, in a very short and comprehensive manner. We shall first transcribe what he says, and then consider the several parts of it in their proper order. "No one is ignorant (says he), that the first law in writing history is, Not to dare to say any thing that is false; and the next, Not to be afraid to speak the truth: that on the one hand there be no suspicion of affection, nor of prejudice on the other. These foundations are what all are acquainted with. But the superstructure consists partly in things, and partly in the style or language. The former require an order of times, and descriptions of places. And because in great and memorable events, we are desirous to know first their causes, then the actions themselves, and lastly their consequences; the historian should take notice of the springs or motives, that occasioned them; and, in mentioning the facts themselves, should not only relate what was done or said, but likewise in what manner; and, in treating upon their consequences, shew if they were the effects of chance, wisdom, or imprudence. Nor should he only recite the actions of great and eminent persons, but likewise describe their characters. The style ought to be fluent, smooth, and even, free from that harshness and poignancy which is usual at the bar." Thus far Cicero. An history written in this manner, and furnished with all these properties, must needs be very entertaining, as well as instructive. And perhaps few have come nearer this plan than Tacitus; though his subject is attended with this unhappy circumstance, or at least unpleasant one, that it affords us examples rather of what we ought to avoid, than what to imitate. But it is the business of the historian, as well as of the philosopher, to represent both virtues and vices in their proper colours; the latter doing it by precepts, and the former by examples. Their manner is different; but the end and design of both is, or should be, the same: And therefore history has not improperly been said by some to be moral philosophy, exemplified in the lives and actions of mankind.

We shall reduce these several things mentioned by Cicero to three heads, Matter, Order, and Style; and treat upon each of them separately. But as Truth is the basis and foundation of all history, it will be necessary to consider that in the first place.

ART. I. *Of Truth in History.*

TRUTH is, as it were, the very life and soul of history, by which it is distinguished from fable or romance. An historian therefore ought not only to be a man of probity, but void of all passion or bias. He must have the steadiness of a philosopher, joined with the vivacity of a poet or orator. Without the former,

he will be insensibly swayed by some passion, to give a false colouring to the actions or characters he describes, as favour or dislike to parties or persons affects his mind. Whereas he ought to be of no party, nor to have either friend or foe while writing; but to preserve himself in a state of the greatest indifference to all, that he may judge of things as they really are in their own nature, and not as connected with this or that person or party. And with this firm and sedate temper, a lively imagination is requisite; without which his descriptions will be flat and cold, nor will he be able to convey to his readers a just and adequate idea of great and generous actions. Nor is the assistance of a good judgment less necessary than any of the former qualities, to direct him what is proper to be said and what to be omitted, and to treat every thing in a manner suitable to its importance. And since these are the qualifications necessary for an historian, it may perhaps seem the less strange, that we have so few good histories.

But historical truth consists of two parts; one is, Not not to say any thing we know to be false: 'Tho' it is not sufficient to excuse an historian in relating a falsehood, that he did not know it was so when he wrote it; unless he first used all the means in his power to inform himself of the truth. For then undoubtedly, an invincible error is as pardonable in history as in morality. But the generality of writers in this kind content themselves with taking their accounts from hearsays, or transcribing them from others; without duly weighing the evidence on which they are founded, or giving themselves the trouble of a strict inquiry. Few will use the diligence necessary to inform themselves of the certainty of what they undertake to relate. And as the want of this greatly abates the pleasure of reading such writers, while persons read with diffidence; so nothing more recommends an historian, than such industry. Thus we are informed of Thucydides, that when he wrote his history of the Peloponnesian war, he did not satisfy himself with the best accounts, he could get from his countrymen the Athenians, fearing they might be partial in their own cause; but spared no expence to inform himself how the same facts were related by their enemies the Lacedæmonians; that, by comparing the relations of both parties, he might better judge of the truth. And Polybius took greater pains than he, in order to write his history of the Roman affairs; for he travelled into Africa, Spain, Gaul, and other parts of the world, that by viewing the several scenes of action, and informing himself from the inhabitants, he might come at a greater certainty of the facts, and represent them in a juster light. But as an historian ought not to assert what he knows to be false; so he should likewise be cautious in relating things which are doubtful, and acquaint his readers with the evidence he goes upon in such facts, from whence they may be able to judge how far it is proper to credit them. So Herodotus tells us what things he saw himself in his travels, and what he heard from the information of the Egyptian priests and others with whom he conversed. And Curtius, in the life of Alexander, speaking of the affairs of India, ingenuously confesses, that he wrote more than he fully believed. "For (says he) I neither dare to affirm positively, what I doubt of; nor can I

think it proper to omit what I have been told." By such a conduct the author secures his credit, whether the things prove really true or false; and gives room for further inquiry, without imposing on his readers.

The other branch of historical truth is, Not to omit any thing that is true, and necessary to set the matter treated of in a clear and full light. In the actions of past ages, or distant countries, wherein the writer has no personal concern, he can have no great inducement to break in upon this rule. But where interest or party is engaged, it requires no small candour, as well as firmness of mind, constantly to adhere to it. Affection to some, aversion to others, fear of disobliging friends or those in power, will often interpose, and try his integrity. Besides, an omission is less obvious to censure, than a false assertion: for the one may be easily ascribed to ignorance or forgetfulness; whereas the other will, if discovered, be commonly looked upon as design. He therefore, who in such circumstances, from a generous love to truth, is superior to all motives to betray or flatter it, justly deserves the character of a brave, as well as honest man. What Polybius says upon this head is very well worth remarking: "A good man ought to love his friends and his country, and to have a like disposition with them, both towards their friends and enemies. But when he takes upon him the character of an historian; they must all be forgot. He must often speak well of his enemies, and commend them when their actions deserve it; and sometimes blame, and even upbraid his greatest friends, when their conduct makes it necessary. Nor must he forbear sometimes to reprove, and at other times to commend, the same persons; since all are liable to mistake in their management, and there are scarce any persons who are always in the wrong. Therefore, in history, all personal considerations should be laid aside, and regard had only to their actions."

What a different view of mankind and their actions should we have, were these rules observed by all historians? Integrity is undoubtedly the principal qualification of an historian; when we can depend upon this, other imperfections are more easily passed over. Suetonius is said to have written the lives of the first twelve Roman emperors with the same freedom wherewith they themselves lived. What better character can be given of a writer? The same ingenuous temper appears in the two Grecian historians above mentioned, Thucydides and Polybius: The former of whom, though banished by his countrymen the Athenians, yet expresses no marks of resentment in his history, either against them in general, or even against the chief authors of it, when he has occasion to mention them; and the latter does not forbear censuring, what he thought blameable in his nearest relations and friends. But it is often no easy matter to know, whether an historian speaks truth or not, and keeps up to the several characters here mentioned; tho' it seems reasonable, upon the common principles of justice due to all mankind, to credit him where no marks of partiality or prejudice appear in his writings. Sometimes, indeed, a judgment may in a good measure be formed of the veracity of an author, from his manner of expressing himself. A certain candour and frankness, that is always uniform and consistent with

itself runs through their writings, who have nothing in view but truth, which may be justly esteemed as a very good evidence of their sincerity. Whereas those, who have partial designs to answer, are commonly more clofe and covert; and if at other times they assume an air of openness and freedom, yet this is not constant and even, but soon followed again with the appearance of some bias and reserve: for it is very difficult to act a part long together, without lying open to a discovery. And therefore though craft and design is exceeding various, and, Proteus like, assumes very different shapes; there are certain characters, by which it may often be perceived and detected. Thus, where things are uncertain by reason of their being reported various ways, it is partiality in an historian to give into the most unfavourable account, where others are as well known and equally credible. Again, it is a proof of the same bad temper, when the facts themselves are certain and evident, but the design and motives of those concerned in them are unknown and obscure, to assign some ill principle, such as avarice, ambition, malice, interest, or any other vicious habit, as the cause of them. This conduct is not only unjust to the persons, whose actions they relate; but hurtful to mankind in general, by endeavouring to destroy the principal motive to virtue, which springs from example. Others, who affect to be more covert, content themselves with suspicions and fly insinuations; and then endeavour to come off, by intimating their unwillingness to believe them, tho' they would have their readers do so. And to mention no more, there are others, who, when they have loaded persons with unjust calumnies and reflections, will allow them some slight commendations, to make what they have said before look more credible, and themselves less partial. But the honest and faithful historian contemns all such low and mean arts; he considers things as they are in themselves, and relates them as he finds them, without prejudice or affection.

ART. II. THE SUBJECT OR ARGUMENT of History.

83
Subject of history.

THE *subject* in general is facts, together with such things as are either connected with them, or may at least be requisite to set them in a just and proper light. But although the principal design of history be to acquaint us with facts, yet all facts do not merit the regard of an historian; but such only as may be thought of use and service for the conduct of human life. Nor is it allowable for him, like the poet, to form the plan and scheme of his work as he pleases. His business is to report things as he finds them, without any colouring or disguise to make them more pleasing and palatable to his reader, which would be to convert his history into a novel. Indeed, some histories afford more pleasure and entertainment than others, from the nature of the things of which they consist; and it may be esteemed the happiness of an historian to meet with such a subject, but it is not his fault if it be otherwise. Thus Herodotus begins his history with shewing, that the barbarians gave the first occasion to the wars between them and the Greeks, and ends it with an account of the punishment which, after some ages, they suffered from the Greeks on that account. Such a relation must not only be very agreeable to his countrymen the Grecians, for whose sakes it was written; but likewise

very instructive, by informing them of the justice of Providence in punishing public injuries in this world, wherein societies, as such, are only capable of punishment. And therefore those examples might be of use to caution them against the like practices. On the contrary, Thucydides begins his history with the unhappy state of his countrymen the Athenians; and in the course of it plainly intimates, that they were the cause of the calamitous war between them and the Lacedemonians. Whereas, had he been more inclined to please and gratify his countrymen, than to write the truth, he might have set things in such a light as to have made their enemies appear the aggressors. But he scorned to court applause at the expense of truth and justice, and has set a noble example of integrity to all future historians. But as all actions do not merit a place in history, it requires no small judgment in an historian to select such only as are proper. Cicero observes very justly, that history "is conversant in great and memorable actions." For this reason, an historian should always keep posterity in view, and relate nothing which may not, upon some account or other, be worth the notice of after-ages. To descend to trivial and minute matters, such as frequently occur in the common affairs of life, is below the dignity of history. Such writers ought rather to be deemed journalists than historians; who have no view or expectation that their works should survive them. But the skilful historian is fired with a more noble ambition. His design is to acquaint succeeding ages with what remarkable occurrences happened in the world before them; to do justice to the memory of great and virtuous men; and at the same time to perpetuate his own. Pliny the younger has some fine reflections upon this head, in a letter to a friend. "You advise me (says he) to write an history; and not you only, for many others have done the same, and I am myself inclined to it. Not that I believe myself qualified for it, which would be rash to think, till I have tried; but because I esteem it a generous action not to suffer those to be forgotten, whose memory ought to be eternized; and to perpetuate the names of others, together with one's own. For there is nothing I am so desirous or ambitious of, as to be remembered hereafter; which is a thing worthy of a man, especially of one who, conscious of no guilt, has nothing to fear from posterity. Therefore I am thinking day and night by what means, as Virgil says,

—My name

To raise aloft;

That would suffice me; for it is above my wish to add with him,

and wing my flight to fame.

But oh!

However, this is enough, and what history alone seems to promise." This was Pliny's opinion, with regard to the use and advantage of history; the subjects of which are generally matters of weight and importance. And therefore, when a prudent historian thinks it convenient to take notice of things in themselves less considerable, he either does it with brevity, or for some apparent reason, or accounts for it by some just apology. So Dion Cassius, when he has mentioned some things of lesser moment in the life of Commodus (as indeed that emperor's life was chiefly filled up with cruelty

Lik. v. ep. 8.

crudely and folly), makes this excuse for himself: "I would not have it thought that I descend below the gravity of history in writing these things. For, as they were the actions of an emperor, and I was present and saw them all, and both heard and conversed with him, I did not think it proper to omit them." He seems to think those actions, when performed by an emperor, might be worth recording, which, if done by a person of inferior rank, would scarce have deserved notice. Nor does he appear to have judged amiss, if we consider what an influence the conduct and behaviour of princes, even in the common circumstances of life, have upon all beneath them; which may sometimes render them not unworthy the regard of an historian, as examples either for imitation, or caution.

But, although facts in general are the proper subject of history, yet they may be differently considered with regard to the extent of them, as they relate either to particular persons, or communities of men. And from this consideration, history has been distinguished into three sorts, viz. *biography*, *particular*, and *general history*. The lives of single persons is called *biography*. By *particular history* is meant that of particular states, whether for a shorter or longer space of time. And *general history* contains an account of several states existing together in the same period of time.

1. The subjects of *biography* are the lives either of public or private persons; for many useful observations in the conduct of human life may be made from just accounts of those who have been eminent and beneficial to the world in either station. Nay, the lives of virtuous persons are not without their use, as warnings to others, by observing the fatal consequences which sooner or later generally follow such practices. But, for those who exposed their lives, or otherwise employed their time and labour for the service of their fellow-creatures, it seems but a just debt that their memories should be perpetuated after them, and posterity acquainted with their benefactors. The expectation of this was no small incentive to virtue in the Pagan world. And perhaps every one, upon due reflection, will be convinced how natural this passion is to mankind in general. And it was for this reason, probably, that Virgil places not only his heroes, but also the inventors of useful arts and sciences, and other persons of distinguished merit, in the Elysian fields, where he thus describes them:

Here patriots live, who, for their country's good,
In fighting fields were prodigal of blood:
Priests of unblemish'd lives here make abode,
And poets worthy their inspiring god;
And teaching wits of more mechanic parts,
Who grac'd their age with new-invented arts;
Those who to worth their bounty did extend,
And those who knew that bounty to commend:
The heads of these with holy fillets bound,
And all their temples were with garlands crown'd.

ÆNEID, l. vi. v. 66.

In the lives of public persons, their public characters are principally, but not solely, to be regarded. The world is inquisitive to know the conduct of princes and other great men, as well in private as public. And both, as has been said, may be of service, considering the influence of their examples. But to be

over-inquisitive in searching into the weaknesses and infirmities of the greatest or best of men, is, to say no more of it, but a needless curiosity. In the writers of this kind, Plutarch is justly allowed to excel.

But it has been a matter of dispute among the learned, whether any one ought to write his own history. It may be pleaded in favour of this, that no one can be so much master of the subject as the person himself: and besides, there are many instances, both ancient and modern, to justify such a conduct. But on the other hand it must be owned, that there are many inconveniences which attend it, some of which are mentioned by Cicero. "If (says he) there is any thing commendable, persons are obliged to speak of themselves with greater modesty, and to omit what is blameable in others. Besides, what is said is not so soon credited, and has less authority; and after all, many will not stick to censure it." And Pliny says very well to the same purpose, "Those who proclaim their own virtues, are thought not so much to proclaim them because they did them, as to have done them that they might proclaim them. So that which would have appeared great if told by another, is lost when related by the party himself. For when men cannot deny the fact, they reflect upon the vanity of its author. Wherefore, if you do things not worth mentioning, the actions themselves are blamed; and if the things you do are commendable, you are blamed for mentioning them." These reflections will be generally allowed to be very just; and yet considering how natural it is for men to love themselves, and to be inclined in their own favour, it seems to be a very difficult task for any one to write an impartial history of his own actions. There is scarce any treatise of this kind that is more celebrated than Cæsar's Commentaries. And yet Suetonius tells us, that "Agnius Pollio (who lived at that time,) thought they were neither written with due care nor integrity: that Cæsar was often too credulous in his accounts of what was done by other persons; and misrepresented his own actions, either designedly, or through forgetfulness: and therefore he supposes he would have revised and corrected them." However, at some times it may doubtless be justifiable for a person to be his own historian. Plutarch mentions two cases wherein it is allowable for a man to commend himself, and be the publisher of his own merits. These are, when the doing of it may be of considerable advantage, either to himself or others. It is indeed less invidious for other persons to undertake the province. And especially for a person to talk or write of his own virtues, at a time when vice and a general corruption of manners prevails, let what he says be ever so true, it will be apt at least to be taken as a reflection upon others. "Anciently (says Tacitus), many wrote their own lives, rather as a testimony of their conduct, than from pride." Upon which he makes this judicious remark: "That the more virtue abounds, the sooner the reports of it are credited." But the ancient writers had a way of taking off the reader's attention from themselves, in recording their own actions, and so rendering what they said less invidious: and that was, by speaking of themselves in the third person, and not in the first. Thus Cæsar never says,

Ad Fem.
lib. v.
cp. 12.

Lib. viii.
cp. 1.

"I did," or "I said, this or that;" but always, "Cæsar did, or said, so and so." Why the moderns have not more chosen to follow them in this, we know not, since it seems less exceptionable.

2. In a continued history of *particular* states, some account may be given of their original, and founders; the nature of their soil, and situation; what advantages they have for their support or improvement, either within themselves, by foreign traffic, or conquests; with the form of their government. Then notice should be taken of the methods by which they increased in wealth or power, till they gradually advanced to their highest pitch of grandeur; whether by their virtue, the goodness of their constitution, trade, industry, wars, or whatever cause. After this the reasons of their declension should be shewn, what were the vices that principally occasioned it, (for that is generally the case), whether avarice, ambition, luxury, discord, cruelty, or several of these in conjunction. And lastly, where that has been their unhappy fate, how they received their final ruin and subversion. Most of these things Livy had in view, when he wrote his history of the Roman state, as he acquaints his readers in the preface. "The accounts (says he) of what happened either before, or while the city was building, consisting rather of poetical fables than any certain records of facts, I shall neither assert nor confute them. Let antiquity be allowed to make the origin of their cities more venerable, by uniting things human and divine. But if any nation may be suffered to fetch their origin from the gods, such is the military glory of the Romans, that when they represent Mars as the father of their founder, other nations may as easily acquiesce in this, as they do in their government. But I lay no great stress upon these things, and others of the like nature, whatever may be thought of them. What I am desirous every one should carefully attend to, are our lives and manners; by what men, and what arts, civil and military, the empire was both acquired and enlarged: then let him observe, how our manners gradually declined under our discipline; afterwards grew worse and worse; and at length so far degenerated, that at present we can neither bear with our vices, nor suffer them to be remedied. This is the chief benefit and advantage to be reaped from history, to fetch instructions from eminent examples of both kinds; in order to imitate the one, which will be of use both to yourself and your country, and avoid the other, which are equally base in their life and event." Thus far Livy. And how well he has executed this design, must be acknowledged by all who will be at the pains to peruse his work.

3. But as a particular history consists in a number of facts relating to the same state, suitably connected and laid together in a proper series; so a *general* history is made up of several particular histories, whose separate transactions within the same period of time, or part of it, should be so distinctly related as to cause no confusion. Such was the history of Diodorus Siculus, which contained an account of most of the eminent states and kingdoms in the world, though far the greatest part of it is now unhappily lost. Of the same nature is the history of Herodotus, though not so extensive; to whom we are especially indebted for the

Perian affairs. And to this kind may likewise be referred Justin's history, though it be only the epitome of a larger work, written by another hand. The rules proper for conducting such histories are much the same as those above mentioned concerning particular histories; excepting what relates to the *order*, of which we shall have occasion to speak hereafter.

But the histories, both of particular states and those which are more general, frequently contain only the affairs of some short period of time. Thus the history of the Peloponnesian war, written by Thucydides, comprises only what was done in the first twenty years of that war, which lasted seven years longer than his account reaches; though indeed the reason of that might be, because Thucydides died before the war was finished, otherwise he would very probably have continued his history to the conclusion of it. But the history of the war between the Romans and king Jugurtha in Africa, given us by Sallust, as also Cæsar's histories of the Gallic and civil wars, are all confined within a much less number of years than that of Thucydides. Nay, sometimes one single transaction is thought sufficient to furnish out an history. Such was the conspiracy of Catiline to subvert the Roman state, written likewise by Sallust. As to more general histories, Xenophon's history of Greece may be esteemed as such, which in order of time succeeds that of Thucydides, and contains the affairs of forty-eight years. And Polybius called his a *general history*; which, though it principally contained the Roman affairs, yet took in the most remarkable transactions of several other states, for the space of fifty-three years: though it has met with the same hard fate as that of Diodorus Siculus, so that only the first five books out of forty, of which it consisted at first, now remain entire. And to mention no more, the celebrated history of Thuanus is another instance of this sort, in which the principal transactions of Europe for about sixty years, chiefly in the sixteenth century, are described with that judgment and fidelity, and in a manner so accurate and beautiful, that he has been thought scarcely inferior to any of the ancient historians. Now, in such histories as these, to go farther back than is requisite to set the subject in a just light, seems as improper as it is unnecessary.

The general subject or argument of history, in its several branches, may be reduced to these four heads; *narration, reflections, speeches, and digressions.*

I. By *narration* is meant a description of facts or of actions, with such things as are necessarily connected with them, namely, persons, time, place, design, and event.

As to *actions* themselves, it is the business of the historian to acquaint his readers with the manner in which they were performed; what measures were concerted on all sides, and how they were conducted, whether with vigilance, courage, prudence, and caution, or the contrary, according to the nature of the action; as likewise, if any unforeseen accidents fell out, by which the designed measures were either promoted or broken. All actions may be referred to two sorts, military and civil. And as war arises from injustice, and injuries received, on one side or the other, it is fit the reader should be informed who were the

the aggressors. For though war is never to be dis-
sisted, yet it is sometimes necessary. In the description
of battles, regard should be had equally to both parties,
the number of forces, conduct of the generals, in
what manner they engaged, what turns and changes
happened in the engagement, either from accidents,
courage, or stratagem, and how it issued. The like
circumstances should all be observed in sieges and other
actions. But the most agreeable scene of history arises
from a state of peace. Here the writer acquaints
us with the constitution of states, the nature of their
laws, the manners and customs of the inhabitants, the
advantages of concord and unanimity, with the dis-
advantages of contention and discord; the invention
of arts and sciences, in what manner they were im-
proved and cultivated, and by whom; with many
other things, both pleasant and profitable in the con-
duct of life.

As to *persons*, the characters of all those should be
described who act any considerable part in an history.
This excites the curiosity of the reader, and makes
him more attentive to what is said of them; as every
one is more inquisitive to hear what relates to others,
in proportion to his knowledge of them. And it will
likewise be of use to observe, how their actions agree
with their characters, and what were the effects of
their different qualifications and abilities.

The circumstances of *time* and *place* are carefully to
be regarded by an historian, without which his ac-
counts of facts will be frequently very lame and im-
perfect. And therefore chronology and geography
seem not improperly to have been called the *two eyes*
of history. Besides, they very much assist the memory.
For it is much easier to remember any thing said to
be done at such a time, and in such a place, than if
only related in general. Nay, the remembrance of
these often recalls those things to mind, which other-
wise had been obliterated. By time is meant not
only the year of any particular æra or period; but
likewise the season, as summer or winter; and the
age of particular persons. For it is oftentimes from
hence that we are principally enabled to make a just
estimate of facts. Thus Cicero commends Pompey for
undertaking and finishing the Piratic war at a season of
the year when other generals would not have thought
it safe to venture out at sea. This double danger, as
well from the weather as the enemy, considering the
necessity of the case, heightens the glory of the ac-
tion; since to have done the same thing in summer,
would not have been an equal proof of the courage
and intrepidity of the general. And there is nothing
more surprising in the conquests of Alexander, than
that he should subdue so large a part of the world by
that time he was little more than thirty years old; an
age at which few other generals have been much dis-
tinguished. Had we not known this, a considerable
part of his character had been lost.

The like advantages arise from the other circum-
stances of place. And therefore, in marches, battles,
and other military actions, the historian should take
notice of the nature of the country, the passes, rivers,
distances of places, situation of the armies, and strength
of the towns, either by nature or art; from which
the reader may the better form a judgment of the dif-
ficulties and greatness of any enterprise. Cæsar is ge-

nerally very particular in these things, and seems to
have thought it highly requisite in order to give his
readers a just idea of his actions. The descriptions of
countries, cities, and rivers, are likewise both useful
and pleasant; and help us to judge of the probability
of what is related concerning the temper and genius
of the inhabitants, their arts, traffic, wealth, power,
or whatever else is remarkable among them.

But an accurate historian goes yet further, and con-
siders the *causes* of actions, and what were the *designs*
and views of those persons who were principally con-
cerned in them. Some, as Polybius has well observed,
are apt to confound the beginnings of actions with
their springs and causes, which ought to be carefully
separated. For the causes are often very remote, and
to be looked for at a considerable distance from the ac-
tions themselves. Thus, as he tells us, some have re-
presented Hannibal's besieging Saguntum in Spain,
and passing the Ebro, contrary to a former agreement
between the Romans and Carthaginians, as causes of
the second Punic war. But these were only the begin-
nings of it. The true causes were the jealousies and
fears of the Carthaginians from the growing power of
the Romans; and Hannibal's inveterate hatred to them,
with which he had been impregnated from his infancy.
For his father, whom he succeeded in the command of
the Carthaginian army, had obliged him, when but nine
years old, to take a most solemn oath upon an altar never
to be reconciled to the Romans: and therefore he was
no sooner at the head of the army, than he took the
first opportunity to break with them. Again, the true
springs and causes of action are to be distinguished
from such as are only feigned and pretended. For gene-
rally the worse designs men have in view, the more soli-
citous they are to cover them with specious pretences.
It is the historian's business, therefore, to lay open,
and expose to view, these arts of politicians. So, as
the same judicious historian remarks, we are not to
imagine Alexander's carrying over his army into Asia
to have been the cause of the war between him and the
Persians. That had its being long before. The Gre-
cians had formerly two armies in Asia, one under Xe-
nophon, and the other commanded by Agésilas. Now
the Asiatics did not venture to oppose or molest either
of these armies in their march. This made king Phi-
lip, Alexander's father, who was an ambitious prince,
and aspired after universal monarchy, think it might
be a practicable thing to make a conquest of Asia. Ac-
cordingly, he kept it in his view, and made prepara-
tions for it; but did not live to execute it. That was
left for his son. But as king Philip could not have
done this, without first bringing the other states of
Greece into it, his pretence to them was only to avenge
the injuries they had all suffered from the Persians;
though the real design was an universal government,
both over them and the Persians, as appeared after-
wards by the event. But in order to our being well
assured of a person's real designs, and to make the ac-
counts of them more credible, it is proper we should
be acquainted with his disposition, manners, way of
life, virtues, or vices; that by comparing his actions
with these, we may see how far they agree and suit
each other. For this reason Sallust is so particular in
his description of Catiline, and Livy of Hannibal; by
which it appears credible, that the one was capable of
entering.

entering into such a conspiracy against his country, and the other of performing such great things as are related concerning him. But if the causes of actions lie in the dark and unknown, a prudent historian will not trouble himself, or his readers, with vain and trifling conjectures, unless something very probable offers itself.

Lastly, an historian should relate the *issue* and *event* of the actions he describes. This is undoubtedly the most useful part of history; since the greatest advantage arising from it is to teach us experience, from what has happened in the world before us. When we learn from the examples of others the happy effects of wisdom, prudence, integrity, and other virtues, it naturally excites us to an imitation of them, and to pursue the same measures in our own conduct. And, on the contrary, by perceiving the unhappy consequences which have followed from violence, deceit, rashness, or the like vices, we are deterred from such practices. But since the wisest and most prudent measures do not always meet with the desired success, and many cross accidents may happen to frustrate the best concerted designs; when we meet with instances of this nature, it prepares us for the like events, and keeps us from too great a confidence in our own schemes. However, as this is not commonly the case, but in the ordinary course of human affairs like causes usually produce like effects; the numerous examples of the happy consequences of virtue and wisdom, recorded in history, are sufficient to determine us in the choice of our measures, and to encourage us to hope for an answerable success, though we cannot be certain we shall in no instance meet with a disappointment. And therefore Polybius very justly observes, that "he who takes from history the causes, manner, and end of actions, and omits to take notice whether the event was answerable to the means made use of, leaves nothing in it but a bare amusement, without any benefit or instruction." These then are the several things necessary to be attended to in historical narrations, but the proper disposition of them must be left to the skill and prudence of the writer.

II. *Reflections* made by the writer. Some have condemned these, as having a tendency to bias the reader; who should be left to draw such conclusions from the accounts of facts, as he sees proper. But since all readers are not capable of doing this for themselves, what disadvantage is it for the author to suggest to them such observations as may assist them to make the best use of what they read? And if the philosopher is allowed to draw such inferences from his precepts, as he thinks just and proper; why has not the historian an equal right to make reflections upon the facts he relates? The reader is equally at liberty to judge for himself in both cases, without danger of being prejudiced. And therefore we find, that the best historians have allowed themselves this liberty. It would be easy to prove this by a large number of instances, but one or two may here suffice. When Salust has given a very distinct account of the designs of Catiline, and of the whole scheme of the conspiracy, he concludes it with this reflection: "All that time the empire of the Romans seems to me to have been in a very unhappy state. For when they had extended their conquests through the

whole world from east to west, and enjoyed both peace and plenty, which mankind esteem their greatest happiness; some persons were obstinately bent upon their own ruin, and that of their country. For notwithstanding two decrees were published by the senate, not one out of so great a multitude was prevailed with, by the rewards that were offered, either to discover the conspiracy, or to leave the army of Catiline. So desperate a disease, and as it were infection, had seized the minds of most people!" And it is a very handsome observation that Livy makes upon the ill conduct of Hannibal in quartering his army in Capua after the battle of Cannæ; by which means they lost their martial vigour through luxury and ease. "Those (says he), who are skilled in military affairs reckon this a greater fault in the general, than his not marching his army immediately to Rome after his victory at Cannæ; for such a delay might have seemed only to defer the victory, but this ill step deprived him of the power to gain it." The modesty of the historian in this passage is worth remarking, in that he does not represent this as his own private opinion, and by that means undertake to censure the conduct of so great a general as Hannibal was; but as the sense of those who were skilled in such affairs. However, an historian should be brief in his remarks; and consider, that altho' he does not exceed his province, by applauding virtue, expressing a just indignation against vice, and interposing his judgment upon the nature and consequences of the facts he relates; yet there ought to be a difference between his reflections, and the encomiums or declamations of an orator.

III. *Speeches* inserted by historians. These are of two sorts, oblique and direct. The former are such, as the historian recites in his own person, and not in that of the speaker. Of this kind is that of Hannibal in Justin; by which he endeavours to persuade king Antiochus to carry the seat of the war against the Romans into Italy. It runs thus: "Having desired liberty to speak, (he said,) none of the present counsels and designs pleased him; nor did he approve of Greece for the seat of the war, which might be managed in Italy to greater advantage: because it was impossible to conquer the Romans but by their own arms, or to subdue Italy but by its own forces; since both the nature of those men, and of that war, was different from all others. In other wars, it was of great importance to gain an advantage of place or time, to ravage the countries and plunder the towns; but tho' you gain some advantage over the Romans, or defeat them, you must still fight with them when beaten. Wherefore, should any one engage with them in Italy, it was possible for him to conquer them by their own power, strength, and arms, as he himself had done. But should he attempt it out of Italy, the source of their power, he would be as much deceived, as if he endeavoured to alter the course of a river, not at the fountain-head, but where its streams were largest and deepest. This was his judgment in private, and what he had offered as his advice, and now repeated in the presence of his friends; that all might know, in what manner a war ought to be carried on against the Romans, who were invincible abroad, but might be conquered at home. For they might sooner be driven out of their city than their empire, and from Italy than their

Composi-
tion of
History.

Composi-
tion of
History.

Lib. xxxi.
c. 5.

their provinces; having been taken by the Gauls, and almost subdued by himself. That he was never defeated, till he withdrew out of their country; but upon his return to Carthage, the fortune of the war was changed with the place." He seems to intimate by this speech, that the Romans were like some fierce and impetuous animals, which are no otherwise to be subdued than by wounding them in some vital part. In speeches related after this manner, we are not necessarily to suppose the historian gives us the very words in which they were at first delivered, but only the sense. But, in direct speeches, the person himself is introduced as addressing his audience; and therefore, the words, as well as the sense, are to be suited to his character. Such is the speech of Eumenes, one of Alexander's captains and successors, made to his soldiers when they had traitorously bound him in chains, in order to deliver him up to his enemy Antigonus, as we have it in the same writer. "You see, soldiers, (says he), the habit and ornaments of your general, which have not been put upon me by mine enemies; that would afford me some comfort: it is by you, that of a conqueror I am become conquered, and of a general a captive; though you have sworn to be faithful to me four times within the space of a year. But I omit that, since reflections do not become persons in calamity. One thing I intreat, that, if Antigonus must have my life, you would let me die among you. For it no way concerns him, how, or where I suffer, and I shall escape an ignominious death. If you grant me this, I free you from your oath, with which you have been so often engaged to me. Or, if shame restrains you from offering violence to me at my request, give me a sword, and suffer your general to do that for you without the obligation of an oath, which you have sworn to do for your general."

Lib. xiv.
c. 4.

But this likewise is a matter in which critics have been divided in their sentiments; whether any, or what kind, of speeches ought to be allowed in history. Some have thought all speeches should be excluded. And the reason given for that opinion is this; that it breaks the thread of the discourse, and interrupts the reader, when he is desirous to come to the end of an action, and know how it issued. This is true indeed, when speeches are either very long, or too frequent; but otherwise they are not only entertaining, but likewise instructive. For it is of service to know the springs and reasons of actions; and these are frequently opened and explained in the speeches of those by whom they were performed. Others therefore have not been against all speeches in general, but only direct ones. And this was the opinion of Probus Pompeius, as Justin informs us; though he did not think fit to follow him in that opinion, when he abridged him, as we have seen already by the speech of king Eumenes. The reason offered against direct speeches is, because they are not true, and truth is the foundation of all history, from which it never ought to depart. Such speeches, therefore, are said to weaken the credit of the writer; since he, who will tell us, that another person spoke such things, which he does not know that he ever did speak, and in such language as he could not use, may take the same liberty in representing his actions. Thus, for example, when Livy gives us the speeches of Romulus, the Sabine women, Brutus, and others, in the

VOL. V.

first ages of the Roman state, both the things themselves are imaginary, and the language wholly disagreeable to the times in which those persons lived. Accordingly we find, that when several historians relate some particular speech of the same person, they widely differ both in the subject-matter and expressions. So the speech of Veturia, by which the dissuaded her son Coriolanus from besieging Rome when he came against it with an army of Volscians to avenge the injuries he had received, is very differently related by Livy, Dionysius of Halicarnassus, and Plutarch. Such fictitious speeches therefore are judged more fit for poets, who are allowed a greater liberty to indulge their fancy than historians. And if any direct speeches are to be inserted, they should be such only as were really spoken by the persons to whom they are ascribed, where any such have been preserved. These have been the sentiments of some critics, both ancient and modern. However, there is scarce an ancient historian now extant, either Greek or Latin, who has not some speeches, more or less, in his works; and those not only oblique, but also direct. They seem to have thought it a necessary ornament to their writings; and even where the true speeches might be come at, have chosen rather to give them in their own words, in order, probably, to preserve an equality in the style. Since therefore the best and most faithful historians have generally taken this liberty, we are to distinguish between their accounts of facts, and their speeches. In the former, where nothing appears to the contrary, we are to suppose they adhere to truth, according to the best information they could get; but in the latter, that their view is only to acquaint us with the causes and springs of actions, which they chose to do in the form of speeches, as a method most ornamental to the work, and entertaining to the reader: Though the best historians are cautious of inserting speeches, but where they are very proper, and upon some solemn and weighty occasions. Thucydides is said to have been the first who brought complete and finished speeches into history, those of Herodotus being but short and imperfect. And tho' Dionysius of Halicarnassus, in his censure upon Thucydides, seems then to have disliked that part of his conduct; yet he afterwards thought fit to imitate it in his *Antiquities of Rome*, where we find many, not only oblique, but also direct, speeches.

What has been said of speeches, may likewise be understood of letters, which we sometimes meet with in histories; as that of Alexander to Darius in Q. Curtius, those of Tiberius and Drusus in Tacitus, and many others. Some letters are wholly fictitious; and in others perhaps the historian represents the substance of what was really said, but gives it his own dress. Thus we find, that short letter of Lentulus to Catiline, at the time of his conspiracy, differently related by Cicero and Sallust. The reason of which seems to be this: That as Cicero recited it publicly to the people of Rome, in his third oration against Catiline, it is reasonable to imagine, he did it in the very words of the letter, which he had by him; whereas Sallust, as an historian, might think it sufficient to give the sense of it in his own words.

IV. *Digressions.* These, if rightly managed, afford the reader both delight and profit. Like speeches, they should neither be too long nor frequent; lest they in-

21 B

inter-

Lib. xxxviii.
c. 3.

Lib. iv.
c. 1.
Ann. lib. i.
73. iii. 53.
59.

Composi-
tion of
History.

terrupt the course of the history, and divert the reader from the main design of the work. But now and then to introduce a beautiful description, or some remarkable incident, which may give light to the subject, is so far from an interruption, that it is rather a relief to the reader, and excites him to go on with greater pleasure and attention. See further on this head, ORATORY, n° 37.

ART. III. OF ORDER.

88
Of order.

SINCE most histories consist of an introduction and the body of the work, in each of which some order is requisite, we shall speak to them separately.

1. The design of the introduction is the same here as in orations. For the historian proposes three things by his introduction, which may be called its parts; to give his reader some general view of the subject, to engage his attention, and to possess him with a candid opinion of himself and his performance. Some have thought this last unnecessary for an historian. But if we consider how differently mankind are apt to judge of the same persons and actions, it seems as requisite for an historian to be well esteemed as an orator. And therefore we find some of the best historians have not omitted this part. Livy's introduction has been very much applauded by the learned, as a master-piece in its kind. It begins with an account of his design. "Whether (says he) it may answer any valuable end for me to write the history of the Roman affairs from the beginning of the city, I neither am certain, nor, if I was, should I venture to declare it." Soon after he endeavours to prepare the reader's attention, by representing the grandeur and usefulness of the subject in the following words: "Either I am prejudiced in favour of my subject, or there never was any state greater, more virtuous, and fruitful of good examples, or in which avarice and luxury had a later admittance, or poverty and thriftiness were either more highly or longer esteemed, they always coveting less, the less they enjoyed." And then he presently proceeds to ingratiate himself with his readers, and gain their favourable opinion: "Although my name is obscure in so great a number of writers, yet it is a comfort, that they cloud it by their fame and character. But I shall gain this advantage by my labour, that I shall be diverted for a time from the prospect of those evils which the age has seen for so many years; while my mind is wholly intent upon former times, free from all that care which gives the writer an uneasiness, though it cannot bias him against the truth." In this passage we see he endeavours to gain the good esteem of his readers from two very powerful motives, modesty, and a strict regard to truth. It may scarce seem necessary to observe, that those introductions are esteemed the best which are most natural; that is, such as are taken from the subject-matter of the history itself, and closely connected with it. Such are those of Herodotus, Thucydides, Livy, Tacitus, and others. And therefore Sallust is greatly blamed by Quintilian on the account of his introductions, which are so general, that they might suit other histories as well as those to which they are prefixed. Introductions should likewise be proportioned to the length of the work. We meet with some few histories, in which the writers immediately enter upon their subject, without any intro-

Composi-
tion of
History.

duction; as Xenophon in his Expedition of the younger Cyrus, and Cæsar in his Commentaries of the Gallic and Civil Wars. But the latter does not profess to write a just history; and therefore left himself more at liberty, as well in this respect as in some others.

2. But order is principally to be regarded in the body of the work. And this may be managed two ways; either by attending to the time in a chronological series, or the different nature and circumstances of the things contained in the history. However, as these two methods do not equally suit all subjects, we shall a little consider to what kind of histories each of them seems more properly adapted. All history then, as we have observed already, may be reduced to three sorts; *biography, the history of particular states, and the general history of several states* existing at the same time.

In biography, or the lives of particular persons, most writers follow the order of time; though some reduce them to certain general heads, as their virtues and vices, or their public and private character. Plutarch and Cornelius Nepos have taken the former method, and Suetonius the latter.

As to the history of particular states, the order of time is generally best, as being most natural and easy. And therefore it has usually been observed by the best historians, as Thucydides, Livy, and others. Tacitus, indeed, wrote two distinct works; one of which he called *Annals*, and the other *Histories*. And, as in both he has kept to the order of time, critics have been at a loss to assign any other reason for these different titles, unless that in the former work he confines himself more closely to the facts themselves, and does not treat so largely upon the causes, manner, or event of them, as he has done in the latter. And even in the circumstances of facts, there is a certain order proper to be observed, for rendering the account more plain and intelligible. Thus, for instance, in the description of a battle or siege, the time should first be known, then the chief person or persons who conducted it, then the number of forces and other requisites, afterwards the nature of the place, then the action itself, and lastly the event. But sometimes it is necessary to add the time in which several of the other circumstances happened, especially in actions of any considerable length. Where the order of these circumstances is confused, it perplexes the account, and renders it both less entertaining to the reader, and more difficult to remember.

In a general history, the order of time cannot always be preserved; though, where the actions of different communities have respect to one as the principal, they should all, as far as possible, be referred to the transactions of that state. But even here the several affairs of those different states ought to be related separately, which will necessarily occasion the anticipating some things, and postponing others, so that they cannot all stand in the order of time in which they were performed. However, Velleius Paterculus says very justly with regard to this subject, That "every entire action, placed together in one view, is much better apprehended than if divided by different times." In this case, therefore, for better preserving the chronology, it is usual with historians, when they have finished any particular narrative, in passing to the
next,

Composition of History.

Composition of History.

Gell. Lib. xi. c. 8.

next, to express the time by some short and plain transition; and sometimes to apologize for themselves, by assigning the reasons of their conduct. So Polybius, whose history is of this kind, says concerning himself: "As in writing the actions of each year, in the order of time, I endeavour to represent the affairs of the same nation together in one summary view, it is plain that inconvenience must of course attend this way of writing." Curtius professes only to write the actions of Alexander king of Macedon; but his history contains in it the principal affairs of the greatest states in the world during that period. Now although, in the course of those transactions, the war between Archelaus governor of Macedonia, and Agis king of Sparta, happened before the battle of Alexander at Arbela; yet the historian not only relates that battle first, but carries on the account of Alexander's affairs in Asia to the death of Darius without interruption; for which he gives this reason: "If I should relate the affairs of Alexander, which happened in the mean time, either in Greece, or Illyrium and Thrace, each in their proper order and time, I must interrupt the affairs of Asia; which it is much better to represent together in one continued series as they fell out, to the flight and death of Darius." Such anachronisms, therefore, are nothing more than what necessarily arise sometimes from the nature of the subject: As every thing, the more complex it is, and contains under it a greater number of parts, is more difficult to be digested in a regular order. But in an history composed of several states, whose affairs are independent of one another, the actions of each nation must necessarily be separated, in order to represent them in a just view, and prevent confusion. This is the method which Herodotus has taken, as likewise Diodorus Siculus and Justin. Now both the pleasure and benefit which such histories afford, arise from observing the conduct of each state separately in the course of their affairs, and then comparing one with the other. And as the order of time must frequently be interrupted, it is not unusual to continue the chronology at proper distances in relating the affairs of each nation; which preserves an unity in the whole, and connects it in one consistent body.

The division of histories into books was designed only for the better distinction of the subject and ease of the reader. And the dividing these books again into chapters, is rather a practice of later editors, (founded, as they have thought, on the same reasons), than countenanced by the example of ancient writers.

ART. IV. OF STYLE.

AN historical style is said to be of a middle nature, between that of a poet and an orator, differing from both not only in the ornamental parts, but likewise in the common idioms and forms of expression.

Cicero observes, that "nothing is more agreeable in history than brevity of expression, joined with purity and perspicuity." Purity indeed is not peculiar to history, but yet it is absolutely necessary. For no one will ever think him fit to write an history who is not master of the language in which he writes. And therefore, when Albinus had written an history of the Roman affairs in Greek, and apologized for any slips or improprieties that might be found in the language

upon the account of his being a Roman, Cato called him a trifler, for choosing to do that which, after he had done it, he was obliged to ask pardon for doing. Nor is perspicuity less requisite in an historical style. The nature of the subject plainly directs to this. For as history consists principally in narration, clearness and perspicuity is nowhere more necessary than in a relation of facts. But these two properties are to be accompanied with brevity, since nothing is more disagreeable than a long and tedious narrative. And in this respect an historical style differs both from that of poetry and oratory. For the poet frequently heightens and enlarges his descriptions of facts, by dwelling upon every circumstance, placing it in different views, and embellishing it with the finest ornaments of wit and language, to render his images more agreeable. And the orator often does the like, with a design to strike the passions. But such colouring is not the business of an historian, who aims at nothing more than a just and faithful representation of what he relates, in a way best suited to its nature, and in such language as is most proper to set it in a plain and easy light.

Again, Cicero, treating of an historical style, says: "It ought to be fluent, smooth, and even, free from that harshness and poignancy which is usual at the bar." The properties here mentioned distinguish this style from that of judicial discourses, in which the orator often finds it necessary to vary his manner of speaking, in order to answer different views, either of pursuing an argument, pressing an adversary, addressing a judge, or recommending the merits of his cause. This occasions an inequality in his style, while he speaks sometimes directly, at other times by way of question, and intermixes short and concise expressions with round and flowing periods. But the historian has no necessity for such variations in his style. It is his province to espouse no party, to have neither friend nor foe, but to appear wholly disinterested and indifferent to all; and therefore his language should be smooth and equal in his relations of persons and their actions.

But further: Dionysius makes "decency a principal virtue in an historian;" which he explains by saying, that "he ought to preserve the characters of the persons, and dignity of the actions of which he treats." And to do this it seems necessary that an historical style should be animated with a good degree of life and vigour; without which neither the characters of eminent persons, nor their remarkable actions, which make up the main business of history, can be duly represented. For even things in themselves great and excellent, if related in a cold and lifeless manner, often do not affect us in a degree suitable to their dignity and importance. And this seems particularly necessary in speeches, in order to represent what every one says, according to his different country, age, temper, and station of life, in the same manner we may suppose he either really did, or would have spoken himself on that occasion. Besides, there are some scenes of action which require very pathetic and moving language, to represent them agreeably to their nature. And, in descriptions, the most beautiful tropes and lively figures are often necessary to set the ideas of things in a proper light. From whence it appears,

Lib. v. init.

89. Of style.

De Clar. Orat. c. 75.

De Orat. lib. ii. c. 15, 20.

Epist. ad Cn. Pompeium.

Composi-
tion of
History.

that painting and imagery make up no small part of the historian's province, though his colours are not so strong and glittering as those either of the poet or orator. He ought, therefore, to be well acquainted with the manners of men and the nature of the passions, since he is often obliged to describe both; in the former of which Herodotus excels, and Thucydides in the latter, as Dionysius has observed.

Now from these several properties laid down by ancient writers, as requisite for an historical style, it seems upon the whole to agree best with the middle character. And this will further appear, by what they say relating to the ornamental parts of style; namely, composition and dignity. As to the former of these, which respects the structure of sentences, and the several parts of them, Demetrius remarks, that, "An historical period ought neither to rise very high, nor sink very low, but to preserve a medium." This simplicity, (he says,) "becomes the gravity and credit of history; and distinguishes it from oratory on the one hand, and dialogue on the other." His meaning is, that historical periods should neither be so full and sonorous, as is frequent in oratory; nor yet so short and flat, as in dialogue: the former of which, as he says, require a strong voice to pronounce them; and the latter have scarce the appearance of periods. So that, according to this judicious writer, the periods best suited for history are those which, being of a moderate length, will admit of a just rise and cadency, and may be pronounced with ease. And Dionysius tells us, that "History should flow smooth and even, every where consistent with itself, without roughness or chafms in the sound." This relates to the harmony of periods, which arises from such a position of the words as renders the sound pleasant and agreeable, and, as he thinks, ought to be attended to in history. And as to dignity, which respects the use of tropes and figures, the same author says, that "History should be embellished with such figures, as are neither vehement, nor carry in them the appearance of art." This is agreeable to what Cicero observes, in comparing Xenophon and Calisthenes, two Greek historians. "Xenophon the Socratic, (says he,) was the

first philosopher, and after him Calisthenes the scholar of Aristotle, who wrote an history; the latter almost like a rhetorician; but the style of the former is more moderate, and has not the force of an orator, less vehement perhaps, but in my opinion more sweet and pleasant." The difference between these two writers, with regard to their style, consisted chiefly in the choice of their figures, which in Xenophon were more gentle and moderate, and therefore in the judgment of Cicero more agreeable to history. Now these several properties relating to the ornaments of language, as well as those before mentioned, which by ancient writers have been thought requisite for history, are all suited to the middle style, as we have elsewhere shewn at large. See ORATORY, n^o 99—21.

But notwithstanding this general account of the several properties which constitute an historical style, it admits of considerable varieties from the different nature and dignity of the subject. The lives of particular persons do not require that strength and majesty of expression, nor all those ornaments of language, as an history of the Roman empire. And accordingly we find the style of Nepos and Suetonius very different from that of Livy. The former is smooth and easy, scarce rising above the low character; but the latter often approaches near to the sublime. And other historians again have kept a medium between these. Upon the whole, therefore, we may conclude, that the middle style is the proper character for history, tho' historians may sometimes sink into the low character, and at other times rise to the grandeur and magnificence of the sublime, from the different nature of their subject, or some particular parts of it. For that is to be esteemed the proper character of any writing, which in the general best suits it. And this distinction may help us in some measure to reconcile the sentiments of writers upon this head who seem to attribute different characters to an historical style, or at least to judge where the truth lies; since a variety of style is not only requisite in different subjects, but likewise in different parts of the same work.

Composi-
tion of
History.

De Orat.
lib. ii.
c. 14.

H I T

HISTORY of Nature, or NATURAL HISTORY.

See NATURE.

HISTRIO, in the ancient drama, signified an actor or comedian; but more especially a pantomime, who exhibited his part by gestures and dancing.

HITCHING, a large and populous town of Hertfordshire in England, situated near a large wood called *Hitchwood*. The inhabitants make large quantities of malt; and the market is one of the greatest in England is one of the greatest in England for wheat. W. Long. o. 20. N. Lat. 51. 55.

HITHE, a town of Kent in England, which had formerly four parishes; but, by the choking up of its harbour and other accidents, it is now reduced to one. It is a cinque port, and is governed by a justice of the peace and constables. It consists of one street, which is paved; and contains about 150 low houses, mostly built with wood and stone. The chief support of the inhabitants is fishing. It is remarkable

H O A

for a great pile of dry bones in the town, 28 feet long, six broad, and eight high. E. Long. 1. 7. N. Lat. 51. 6.

HIVE, in country affairs, a convenient receptacle for bees. See APIS.

HIVING of Bees. See APIS.

HOACHE, in natural history, a kind of earth approaching to the nature of chalk, but harder, and feeling like soap; whence some think that it is either the same with the soap-rock of Cornwall, or very like it. The Chinese dissolve it in water, till the liquor is of the consistence of cream, and then varnish their China-ware with it.

HOADLEY (Benjamin), successively bishop of Bangor, Hereford, Salisbury, and Winchester, was born in 1676. His first preferment in the church was the rectory of St Peter le Poor, and the leasehold of St Mildred's in the Poultry. In the year 1706, he published some *Remarks* on the late bishop Atterbury's sermon

Histrio
||
Hithe.

Hive
||
Hoadley.

HISTORICAL CHART,

Representing at one View the rise and progress of the principal states & empires of the known world.





Hoadley.

sermon at the funeral of Mr Bennet, in which Dr Atterbury had, in the opinion of Mr Hoadley, laid down some dangerous propositions. Two years after, Mr Hoadley again entered the lists against this formidable antagonist; and in his *exceptions* against a sermon published by Dr Atterbury, intitled "The Power of Charity to cover Sin," he attacked the doctor with his usual strength of reasoning, and dispassionate inquiry.—In 1709, another dispute arose between these two learned combatants, concerning the doctrine of non-resistance, occasioned by a performance of Mr Hoadley's, intitled "The Measures of Obedience;" some positions in which, Dr Atterbury endeavoured to confute in his elegant Latin sermon, preached that year before the London clergy. In this debate Mr Hoadley signalized himself in so eminent a degree, that the honourable house of commons gave him a particular mark of their regard, by representing, in an address to the queen, the signal services he had done to the cause of civil and religious liberty.—The principles, however, which he espoused being repugnant to the general temper of those times, drew on him the virulence of a party; yet it was at this period (1710, when, as he himself expressed it, *stary seemed to be let loose upon him*), that the late Mrs Howland presented him to the rectory of Streatham in Surry, unasked, unapplied to, and without his either having seen her or been seen by her. Soon after the accession of king George I. Mr Hoadley was consecrated to the see of Bangor; and 1717 having broached some opinions concerning the nature of Christ's kingdom, &c. he again became the object of popular clamour. At this juncture he was distinguished by another particular mark of the royal regard, by means of which the convocation was successively prorogued, and it was not permitted to sit, nor do any business, till that resentment was entirely subsided. In 1721, he was translated to Hereford; and from thence, in 1723, to Salisbury. In 1734, he was translated to Winchester (on the demise of Dr Willis), and published his *Plain Account of the Sacrament*: a performance which served as a butt for his adversaries to shoot at, yet impartially owns it to be clear, rational, and manly, wrote with great candour and judgment, and suited to the capacity of every serious and considerate inquirer after truth.—His later days were embittered by a most vile instance of fraud and ingratitude. The bishop took a French priest, who pretended to abjure his religion, under his protection, with no other recommendation than that of his necessities; in return for which act of humanity, the priest found an opportunity of getting the bishop's name wrote by his own hand, and causing a note of some thousand pounds to be placed before it, offered it in payment. But the bishop denying it to be his, it was brought before a court of justice, and was there found to be a gross imposition. The ungrateful villain had now recourse to a pamphlet, in which he charged the bishop with being a drunkard, and alleged that he had the note of him when he was in liquor. To this calumny the bishop made a full and nervous answer; in which he exposed the man's falsehood, and solemnly averred that he was never drunk in his whole life. The world with becoming ardour embraced his defence, and he had the happiness to find himself perfectly acquitted even of any

suspicion of such a charge. As a writer, he possessed uncommon abilities. His sermons (published in 1754 and 1755) are esteemed inferior to few writings in the English language, for plainness and perspicuity, energy, and strength of reasoning, and a free and masterly manner. In private life, he was naturally facetious, easy, and complying, fond of company, yet would frequently leave it for the purposes of study or devotion. He was every where happy; and particularly in his own family, where he took all opportunities of instructing by his influence and example. He died in 1761, aged 83. Besides the works already mentioned, he wrote, 1. *Terms of Acceptance*, 8vo. 2. *Reasonableness of Conformity*. 3. *On the Sacrament*.—His tracts and pamphlets are extremely numerous; and the reader may see a complete catalogue of them in his life inserted in the supplement to the *Biographia Britannica*.

HOADLEY (Benjamin), M. D. son of the former, was born in 1706, and studied at Bennet college Cambridge, under the tuition of Dr Herring afterwards archbishop of Canterbury. He took his degree in physic; and particularly applying himself to mathematical and philosophical studies, was, when very young, admitted a member of the royal society. He was made regifter of Hereford, while his father filled that see, and was early appointed physician to his majesty's household, but died at his house in Chelsea in 1757. He wrote, 1. *Three Letters on the organs of respiration*, 4to. 2. *The Suspicious Husband*, a comedy. 3. *Observations on a series of electrical experiments*; and, 4. *Oratio anniverfaria, in Theatro Col. Med. Londin. ex Harveii instituto habita die*, Oârob. 1742.

HOAR-HOUND, in botany. See *MARUBIUM*.

HOARSENESS, in medicine, a diminution of the voice, commonly attended with a preternatural asperity and roughness thereof. The parts affected are the *aspera arteria* and larynx. For its causes and cure, see (the *Index* subjoined to) *MEDICINE*.

HOBBS (Thomas), a famous writer, born at Malmfury in 1588, was the son of a clergyman. He completed his studies at Oxford, and was afterwards governor to the eldest son of William Cavendish earl of Devonshire. He travelled through France and Italy with that young nobleman, and at length applied himself entirely to the study of polite literature. He translated *Thucydides* into English; and published his translation in 1628, in order to shew his countrymen, from the Athenian history, the disorders and confusions of a democratical government. In 1626, his patron the earl of Devonshire died; and in 1628, his son died also: which loss affected Mr Hobbes to such a degree, that he very willingly accepted an offer made him of going abroad a second time with the son of Sir Gervase Clifton; whom he accordingly accompanied into France, and staid there some time. But, while he continued there, he was solicited to return to England, and to resume his concern for the hopes of that family to whom he had attached himself so early, and to which he owed so many and so great obligations.

In 1631, the countess dowager of Devonshire desired to put the young earl under his care, who was then about the age of 13. This was very suitable to Mr

Hoadley

Hobbes.

Hobbes. Mr Hobbes's inclinations, who discharged that trust with great fidelity and diligence. In 1634, he republished his translation of Thucydides, and prefixed to it a dedication to that young nobleman, in which he gives a large character of his father, and represents in the strongest terms the obligations he was under to that illustrious family. The same year he accompanied his noble pupil to Paris, where he applied his vacant hours to the study of natural philosophy, and more especially to the perfect understanding of mechanism, and the causes of animal motion. He had frequent conversations upon these subjects with father Marin Merfenne; a man deservedly famous, and who kept up a correspondence with almost all the learned in Europe. From Paris he attended his pupil into Italy, where at Pisa he became known to that great astronomer Galileo Galilei, who communicated to him his notions very freely; and after having seen all that was remarkable in that country, he returned with the earl of Devonshire into England; afterwards, foreseeing the civil wars, he went to seek a retreat at Paris, where, by the good offices of his friend father Merfenne, he became known to the famous Renatus des Cartes, and afterwards held a correspondence with him upon several mathematical subjects, as appears from the letters of Mr Hobbes published in the works of Des Cartes. But when this philosopher printed afterwards his Meditations, wherein he attempted to establish points of the highest consequence from innate ideas, Mr Hobbes took the liberty of dissenting from him; as did also the French king's mathematical professor, the illustrious Peter Gassendi, with whom Mr Hobbes contracted a very close friendship, which was not interrupted till the death of the former. In 1642, Mr Hobbes printed a few copies of his famous book *De Cive*, which, in proportion as it became known, raised him many adversaries, who charged him with infilling principles which had a dangerous tendency.

Among many illustrious persons who, upon shipwreck of the royal cause, retired to France for safety, was Sir Charles Cavendish, brother to the duke of Newcastle: and this gentleman, being skilled in every branch of the mathematics, proved a constant friend and patron to Mr Hobbes; who, by embarking in 1645 in a controversy about squaring the circle, was grown so famous for it, that in 1647 he was recommended to instruct Charles prince of Wales, afterwards king Char. II. in that kind of learning. His care in the discharge of this office gained him the esteem of that prince in a very high degree: and though he afterwards withdrew his public favour to Mr Hobbes on account of his writings, yet he always retained a sense of the services he had done him; shewed him various marks of his favour after he was restored to his dominions; and, as some say, had his picture hanging in his closet. This year also was printed in Holland, by the care of M. Sorbier, a second and more complete edition of his book *De Cive*; to which are prefixed two Latin letters to the editor, the one by Mr Gassendi, the other by father Merfenne, in commendation of it: and in 1650 was published at London a small treatise of Mr Hobbes's, intitled, "Human Nature;" and another, "*De corpore politico*, or of the elements of the law."

All this time Mr Hobbes had been digesting with great care and pains his religious, political, and moral

principles, into a complete system, which he called the *Leviathan*, and which was printed in English at London in 1650 and 1651. After the publication of his *Leviathan* he returned to England, and passed the summer commonly at his patron the earl of Devonshire's seat in Derbyshire, and some of his winters in town, where he had for his intimate friends some of the greatest men of the age.

In 1660, upon the restoration, he quitted the country, and came up to London, where he obtained from the king assurance of protection, and had an annual pension of L. 100 settled upon him out of the privy purse. Yet this did not render him entirely safe: for, in 1666, his *Leviathan* and his treatise *De Cive* were censured by parliament, which alarmed him very much; as did also the bringing in of a bill into the house of commons to punish atheism and profaneness. When this storm was a little blown over, he began to think of procuring a beautiful edition of his pieces, that were in Latin; but finding this impracticable in England, he caused it to be undertaken abroad, where they were published in quarto in 1668, from the press of John Bleau. In 1669, he was visited by Cosmo de Medicis, then prince, afterwards duke of Tuscany, who gave him ample marks of his esteem and respect; and having received his picture, and a complete collection of his writings, caused them to be deposited, the former among his curiosities, the latter in his noble library at Florence. The like visits he received from foreign ambassadors and other strangers of distinction; who were curious to see a person whose singular opinions and numerous writings had made so much noise all over Europe. In 1672, he wrote his own life in Latin verse, when, as he observes, he had completed his 84th year: and, in 1674, he published in English verse four books of Homer's *Odyssey*, which was so well received, that it encouraged him to undertake the whole *Iliad* and *Odyssey*, which he likewise performed and published in 1675. About this time, he took his leave of London, and went to spend the remainder of his days in Derbyshire; where, however, he did not remain inactive, notwithstanding his advanced age; but published from time to time several pieces, to be found in the collection of his work. He died in 1679, aged 92.

As to his character and manners, they are thus described by Dr White Kennet, in his *Memoirs of the Cavendish family*. "The earl of Devonshire (says he) for his whole life entertained Mr Hobbes in his family, as his old tutor, rather than as his friend or confidant. He let him live under his roof in ease and plenty, and in his own way, without making use of him in any public, or so much as domestic affairs. He would often express an abhorrence of some of his principles in policy and religion; and both he and his lady would frequently put off the mention of his name, and say, 'He was a humourist, and nobody could account for him.' There is a tradition in the family, of the manners and customs of Mr Hobbes, somewhat observable. His professed rule of health was to dedicate the morning to his exercise, and the afternoon to his studies. And therefore, at his first rising, he walked out, and climbed any hill within his reach; or if the weather was not dry, he fatigued himself within doors by some exercise or other, to be in a sweat: recommending

mending that practice upon this opinion, that an old man had more moisture than heat, and therefore by such motion heat was to be acquired and moisture expelled. After this, he took a comfortable breakfast; and then went round the lodgings to wait upon the earl, the countess, and the children, and any considerable strangers, paying some short addresses to all of them. He kept these rounds till about 12 o'clock, when he had a little dinner provided for him, which he eat always by himself without ceremony. Soon after dinner he retired to his study, and had his candle with 10 or 12 pipes of tobacco laid by him; then shutting his door, he fell to smoking, thinking, and writing, for several hours. He retained a friend or two at court, and especially the lord Arlington, to protect him if occasion should require. He used to say, that it was lawful to make use of ill instruments to do ourselves good: 'If I were calf (says he) into a deep pit, and the devil should put down his cloven foot, I would take hold of it to be drawn out by it.' After the restoration, he watched all opportunities to ingratiate himself with the king and his prime ministers; and looked upon his pension to be more valuable, as an earnest of favour and protection, than upon any other account. His future course of life was to be free from danger. He could not endure to be left in an empty house. Whenever the earl removed, he would go along with him, even to his last stage, from Chatsworth to Hardwick. When he was in a very weak condition, he dared not be left behind, but made his way upon a feather-bed in a coach, though he furvied the journey but a few days. He could not bear any discourse of death, and seemed to cast off all thoughts of it: he delighted to reckon upon longer life. The winter before he died, he made a warm coat, which he said must last him three years, and then he would have such another. In his last sickness his frequent questions were, Whether his disease was curable? and when intimations were given, that he might have ease, but no remedy, he used this expression, 'I shall be glad to find a hole to creep out of the world at;' which are reported to have been his last sensible words; and his lying some days following in a silent stupefaction, did seem owing to his mind more than to his body."

The reverend Mr Granger observes, that Hobbes's style is incomparably better than that of any other writer in the reign of Charles I. and was for its uncommon strength and purity scarcely equalled in the succeeding reign. "He has in translation (says he) done Thucydides as much justice as he has done injury to Homer; but he looked upon himself as born for much greater things than treading in the steps of his predecessors. He was for striking out new paths in science, government, and religion; and for removing the land-marks of former ages. His ethics have a strong tendency to corrupt our morals, and his politics to destroy that liberty which is the birthright of every human creature. He is commonly represented as a sceptic in religion, and a dogmatist in philosophy; but he was a dogmatist in both. The main principles of his Leviathan are as little founded in moral or evangelical truths, as the rules he has laid down for squaring the circle are in mathematical demonstration. His book on human nature is esteemed the best of his works."

HOBBY, the name of a hawk called by some authors *subbuteo*. See FALCO.

It is a hawk of the lure, and not of the fist; and is very like the faker, only much less. It makes excellent sport with net and spaniels; for when the birds see the hobby, they dare not commit themselves to the wing, but lie close to the ground, and so are taken in nets.

HODY (Humphy), a learned English divine, was born in 1659. At 21 years of age, he published his celebrated *Dissertation against Aristoteli's history of the 70 interpreters*; which was received with great applause by all the learned, Isaac Vossius excepted, who could not bear to have his opinions opposed by such a youth. Twenty years after, he treated the subject more fully in his *De Bibliorum textibus originalibus, versionibus Græcis & Latina vulgata, libri IV.* In 1689, he wrote the *Prologomena* to John Melala's Chronicle, printed at Oxford; and the year after was made chaplain to Dr Stillingfleet, bishop of Worcester. The deprivation of the nonjuring bishops engaged him in a controversy with Mr Dodwell; which recommended him to archbishop Tillotson, to whom, and his successor Dr Tenison, he was domestic chaplain. In 1698, he was made regius professor of the Greek tongue at Oxford, and archdeacon of Oxford in 1704. On occasion of the controversy about the convocation, he in 1701 published *A history of English councils and convocations, and of the clergy's sitting in parliament, &c.* He died in 1706, leaving in MS. *An account of those learned Grecians who retired to Italy on the taking of Constantinople, &c.* which was published in 1742 by Dr Jebb.

HOE, in country affairs, a tool made like a cooper's adze, to cut up weeds in gardens, &c. This tool is commonly called the *hand hoe*.

HOEING, according to Tull, is the breaking and dividing the soil by tillage, whilst the corn and other plants are growing thereon.—It differs from common tillage (which is always performed before the corn or plants are sown or planted), in the time of performing it, and it is much more beneficial to the crops than any other tillage. See AGRICULTURE, n° 171—175.

HOEMATOPUS, in ornithology, a genus of birds, of the order of grallæ. It has a long compressed bill, with the end cuneated; the nostrils are linear, and the feet have only three toes. There is but one species, the ostralegus, sea-pie, or oyster-catcher. They are very common on most of our coasts, feeding on marine insects, oysters, limpets, &c. Their bills, which are compressed sideways, and end obtusely, are very fit instruments to insinuate between the limpet and the rock to which these shells adhere; which they do with great dexterity, to get at the fish. On the coast of France, where the tides recede so far as to leave the beds of oysters bare, these birds feed on them, forcing the shells open with their bills. They keep in summer-time in pairs, laying their eggs on the bare ground: they lay four of a whitish-brown hue, thinly spotted and striped with black; and when any one approaches their young, they make a loud and shrill noise. In winter, they assemble in vast flocks, and are very wild. The head, neck, scapulars, and coverts of the wings, of this bird are of a fine black;

Hoffman

Hogarth.

in some the neck is marked with white; the wings dusky, with a broad transverse band of white; the bill three inches long, and of a rich orange colour.

HOFFMAN, the name of several eminent physicians; of whom Maurice Hoffman, and John Maurice Hoffman his son, practised at Altorf. Maurice died in 1698, leaving behind him many works; and was succeeded by his son John Maurice, who wrote as well as his father, and died in 1727, highly esteemed by the faculty.—Frederic Hoffman, probably of the same family, was born at Magdeburg in 1660. The principal known circumstances of his life are, his journey into Holland and England, where he became intimately acquainted with Paul Herman, and Robert Boyle; never taking any fees, being supported by his annual stipend; his curing the emperor Charles VI. and Frederic I. king of Prussia of inveterate diseases; to which may be added, his accurate knowledge of the nature and virtues of mineral waters. He survived his 80th year; and his works, which are in great esteem, were printed in six volumes folio at Geneva, in 1740.

HOG, in zoology. See *Sus*.

Hog's *Dung* is, by Mortimer, reckoned one of the richest manures we are acquainted with, and the next in value to sheep's dung, and is found to be equal in virtue to twice the quantity of any other dung except this. The ancients seem to have been displeased with it, on account of its breeding weeds; but this is only accusing it of being too rich, for any dung will do this when laid too thick. It is an excellent manure for pasture-grounds, and excels all other kinds of dung for trees. The farmers who use this kind of dung for their lands, generally take care to save it, by well-paving the flies; and increase the quantity by throwing in bean-stalks, stubble, and many other things of a like nature: and, by good management of this kind, many farmers have procured 50 or 60 loads of excellent manure a-year out of a small flye. The very best way of using this dung is, by mixing it with horse-dung; and for this reason, it is best to have the flye near the stable, that the two cleanings may be mixed in one heap, and used together.

They have in many parts of Staffordshire a poor, light, shallow land, on which they sow a kind of white pea: the land is neither able to bear this nor any thing else to advantage for their reaping; but, when the peas are ripe, they turn in as many hogs as the quantity of peas will fatten, suffering them to live at large, and to remain there day and night: in consequence of this, the land will produce good crops of hay for several years afterwards; or, if too poor for that, it will at worst raise grass enough to make it good pasture-ground.

HOGARTH (William), an excellent moral painter, was born in London, in the parish of St Bartholomew. His father, being poor, put him apprentice to an engraver of pewter-pots, and in this humble situation he passed through his time, without seeming to have any higher views. His apprenticeship was however no sooner expired, than he pursued every method of improving himself in the art of drawing, of which his former master had given him but a rude idea. This ambition was productive of distress; and while

Hogarth.

he spent his time in preparing for his future excellence, he felt all the contempt that indigence could produce. Being one day arrested by his landlady for the trifling sum of 20 shillings, and being bailed by one of his friends; in order to be revenged on her, he drew her picture in caricatura, and in that single figure gave marks of the dawn of a superior genius. The first piece in which he distinguished himself as a painter, was in the figures of the Wandsworth assembly; which are drawn from the life, without any circumstances of his burlesque manner. His next piece was his Pool of Bethesda, which he presented to St Bartholomew's hospital. His being afterwards employed to draw designs for a new edition of Hudibras, proved the first opportunity of signaling himself in that style. The Harlot's Progress was the first of his burlesque pictures, or rather life-pictures; for it is unjust to give them the character either of burlesque or grotesque pieces, since both the one and the other convey to us a departure from nature, to which Hogarth almost always strictly adhered. The ingenious Abbé du Bos has often complained, that no history-painter of his time went through a series of actions, and thus, like an historian, painted the successive fortunes of an hero from the cradle to the grave. What du Bos wished to see done, Hogarth performed. In the above piece, he launches out his young adventurer a simple girl upon the town, and conducts her through all the vicissitudes of wretchedness, to a premature death. This was painting to the reason and to the heart; none had ever before made the art subservient to the purposes of morality and instruction: a book like this is fitted to every soil and every observer, and he that runs may read. The Rake's Progress succeeded the former; which, though not equal to it, came short only of that single excellence, in which no other could come near him in that way. It consists of eight prints; and, like the former, it exhibits a complete history adapted to answer the most moral purposes: as is also his marriage A-la-mode, in six prints; and The Effects of Idleness and Industry, exemplified in the conduct of two fellow-apprentices, in 12 prints, &c.—Mr Hogarth travelled with several of his companions to Paris; but had no sooner landed at Calais, than, attempting to draw the gate of that city, he was taken into custody, on suspicion of his being a spy. He was soon let at liberty: but the resentment he felt on this occasion, induced him to design the satirical print called *the Gate of Calais*; and he never after drew a Frenchman but in caricatura. The last remarkable circumstance of his life was his contest with Mr Churchill. It is said that both met at Westminster-hall; Hogarth to take by his eye a ridiculous likeness of the poet, and Churchill to furnish a description of the painter. But Hogarth's print of the poet was not much esteemed, and the poet's letter to him was but little admired. Some pretend, indeed, to say that it broke the painter's heart; but this we can from good authority say is not true. Indeed the report falls of itself; for we may as well say, that Hogarth's pencil was as efficacious as the poet's pen, since neither long survived the contest.

The following character of this artist is given by Mr Gilpin in his *Essay on Prints*. "The works of this

this

Hogarth. this matter abound in true humour; and satire, which is generally well-directed: they are admirable moral lessons, and a fund of entertainment suited to every taste; a circumstance, which shews them to be just copies of nature. We may consider them too as valuable repositories of the manners, customs, and dresses of the present age. What a fund of entertainment would a collection of this kind afford, drawn from every period of the history of Britain?—How far the works of Hogarth will bear a *critical examination*, may be the subject of a little more inquiry.

“In *design*, Hogarth was seldom at a loss. His invention was fertile; and his judgment accurate. An improper incident is rarely introduced; a proper one rarely omitted. No one could tell a story better; or make it, in all its circumstances, more intelligible. His genius, however, it must be owned, was suited only to *low* or *familiar* subjects. It never soared above *common* life: to subjects naturally sublime, or which, from antiquity or other accidents, borrowed dignity, he could not rise.

“In *composition* we see little in him to admire. In many of his prints the deficiency is so great, as plainly to imply a want of all principle; which makes us ready to believe, that when we do meet with a beautiful group, it is the effect of chance. In one of his minor works, the *Idle Prentice*, we seldom see a crowd more beautifully managed than in the last print. If the sheriff's officers had not been placed in a line, and had been brought a little lower in the picture, so as to have formed a pyramid with the cart, the composition had been unexceptionable; and yet the first print of this work is such a striking instance of disagreeable composition, that it is amazing how an artist who had any idea of beautiful forms, could suffer so unmasterly a performance to leave his hands.

“Of the *distribution of light* Hogarth had as little knowledge as of *composition*. In some of his pieces we see a good effect; as in the *Execution* just mentioned: in which, if the figures at the right and left corners had been *kept down* a little, the light would have been beautifully distributed on the fore-ground, and a fine secondary light spread over part of the crowd. But at the same time there is so obvious a deficiency in point of effect, in most of his prints, that it is very evident he had no principles.

“Neither was Hogarth a master in *drawing*. Of the muscles and anatomy of the head and hands he had perfect knowledge; but his trunks are often badly moulded, and his limbs ill set on: yet his figures, upon the whole, are inspired with so much life and meaning, that the eye is kept in good-humour, in spite of its inclination to find fault.

“The author of the *Analysis of beauty*, it might be supposed, would have given us more instances of *grace* than we find in the works of Hogarth; which shews strongly, that theory and practice are not always united. Many opportunities his subjects naturally afford of introducing graceful attitudes; and yet we have very few examples of them. With instances of picturesque grace his works abound.

“Of his *expression*, in which the force of his genius lay, we cannot speak in terms too high. In every mode of it he was truly excellent. The passions he thoroughly understood; and all the effects which they

produce in every part of the human frame: he had the happy art also of conveying his ideas with the same precision with which he conceived them.—He was excellent too in expressing any humorous oddity which we often see stamped upon the human face. All his heads are cast in the very mould of nature. Hence that endless variety, which is displayed through his works; and hence it is, that the difference arises between his heads, and the affected caricatures of those masters who have sometimes amused themselves with patching together an assemblage of features from their own ideas. Such are Spaniolet's; which, though admirably executed, appear plainly to have no archetypes in nature. Hogarth's, on the other hand, are collections of natural curiosities. The *Oxford-heads*, the *Physician's-arms*, and some of his other pieces, are expressly of this humorous kind. They are truly comic, though ill-natured effusions of mirth: more entertaining than Spaniolet's, as they are pure nature; but less innocent, as they contain ill-directed ridicule.—But the species of expression in which this master perhaps most excels, is that happy art of catching those peculiarities of art and gesture which the ridiculous part of every profession contract, and which for that reason become characteristic of the whole. His counsellors, his undertakers, his lawyers, his usurers, are all conspicuous at sight. In a word, almost every profession may see in his works, that particular species of affectation which they should most endeavour to avoid.

“The *execution* of this master is well suited to his subjects, and manner of treating them. He etches with great spirit, and never gives one unnecessary stroke.”

HOGSHEAD, in commerce, a measure of capacity containing 63 gallons.

HOGUE, a town and cape on the north-west point of Normandy in France; near which admiral Rook burnt the French admiral's ship called the *Rising Sun*, with 12 more large men of war, the day after the victory obtained by admiral Russell near Cherbourg, in May 1692. W. Long. 2. 0. N. Lat. 49. 50.

HOKE-TIDE, a solemn festival celebrated for many ages in England, in memory of the great slaughter of the Danes in the time of king Ethelred, they having been in that reign almost all destroyed in one day in the different parts of the kingdom, and that principally by the women. This is still kept up in some counties, and the women bear the principal sway in it, stopping all passengers with ropes and chains, and exacting some small matter to make merry with.

HOLBEIN (Hans), a celebrated painter, born at Basil in Switzerland in 1498, learned the rudiments of his art from his father, who was a painter; but soon shewed his superior genius. In the town-house of Basil he painted our Saviour's Passion; and in the fish-market of the same city, Death's dance, and a dance of peasants, which were extremely admired; and Erasmus was so pleased with them, that he desired him to draw his picture, and was ever after his friend. He staid some years longer at Basil, till his necessities, occasioned by his own extravagance and an increasing family, made him comply with Erasmus's persuasions to go to England. In his journey he staid some days at Strasburg, where it is said he applied to

Hogarth
Holbein.

Holbein.

a very great painter for work, who took him in, and ordered him to give a specimen of his skill. On which Holbein finished a piece with great care, and painted a fly on the most eminent part of it; after which he privately withdrew in the absence of his master, and pursued his journey, without saying any thing to any body. When the painter returned home, he was astonished at the beauty and elegance of the drawing; and especially at the fly, which he at first took for a real one, and endeavoured to remove it with his hand. He now sent all over the city for his journeyman; but after many inquiries, discovered that he had been thus deceived by the famous Holbein.

Holbein having in a manner begged his way to England, presented a letter of recommendation from Erasmus to Sir Thomas More, and also shewed him Erasmus's picture. Sir Thomas, who was then lord-chancellor, received him with all the joy imaginable, and kept him in his house between two and three years, in which time he drew Sir Thomas's picture, and those of many of his relations and friends. Holbein one day happening to mention a nobleman who had some years before invited him to England, Sir Thomas was very solicitous to know who it was. Holbein said that he had forgot his title, but remembered his face so well, that he believed he could draw his likeness; which he did so perfectly, that the nobleman it is said was immediately known by it. The chancellor having now adorned his apartments with the productions of this great painter, resolved to introduce him to Henry VIII. For this purpose, he invited that prince to an entertainment; having, before he came, hung up all Holbein's pieces in the great hall, in the best order, and placed in the best light. The king, on his first entrance into this room, was so charmed with the sight, that he asked whether such an artist was now alive, and to be had for money? Upon this, Sir Thomas presented Holbein to his majesty; who immediately took him into his service, and brought him into great esteem with the nobility and gentry; by which means he drew a vast number of portraits.

But while he was here, there happened an affair which might have proved fatal to him, had he not been protected by the king. On the report of this painter's character, a lord of the first quality came to see him, when he was drawing a figure after the life. Holbein sent to desire his lordship to defer the honour of his visit to another day; which the nobleman taking for an affront, broke open the door, and very rudely went up stairs. Holbein hearing a noise, came out of his chamber, and meeting the lord at his door, fell into a violent passion, and pushed him backwards from the top of the stairs to the bottom. However, immediately reflecting on what he had done, he escaped from the tumult he had raised, and made the best of his way to the king. The nobleman, much hurt, though not so much as he pretended, was there soon after him; and upon opening his grievance, the king ordered Holbein to ask his pardon. But this only irritated the nobleman the more, who would not be satisfied with less than his life; upon which the king sternly replied, "My lord, you have not now to do with Holbein, but with me; whatever punishment you may contrive by way of revenge against him, shall certainly be inflicted on yourself. Remember,

"pray, my lord, that I can, whenever I please, make "seven lords of seven ploughmen, but I cannot make "one Holbein of even seven lords." Holbein died of the plague at his lodgings at Whitehall, in 1554. "It is amazing (says De Piles), that a man born in "Switzerland, and who had never been in Italy, "should have so good a *gusto*, and so fine a genius for "painting." He painted alike in every manner; in fresco, in water-colours, in oil, and in miniature. His genius was sufficiently shewn in the historical style, by two celebrated compositions which he painted in the hall of the Stillyard company. He was also eminent for a rich vein of invention, which he shewed in a multitude of designs which he drew for engravers, statuaries, jewellers, &c. and he had this singularity, that he painted with his left-hand.

HOLCUS, INDIAN MILLET or CORN; a genus of the monœcia order, belonging to the polygamia class of plants.

Species. Of this genus there are ten species, two of which are natives of Britain. The most remarkable of these is the lanatus, or creeping soft-grass of Hudson; for the description and properties of which, see AGRICULTURE, n° 57. The most remarkable of the foreign species is the forghum, or Guinea-corn. The stalks are large, compact, and full eight feet high. In Senegal the fields are entirely covered with it. The negroes, who call it *guarnot*, cover the ears when ripe with its own leaves to shelter it from the sparrows, which are very mischievous in that country. The grain made into bread, or otherwise used, is esteemed very wholesome. With this the slaves in the West Indies are generally fed, each being allowed from a pint to a quart every day. The juice of the stalks is so agreeably luscious, that, if prepared as the sugar-canes, they would afford an excellent sugar. The negroes on the coast of Guinea make of two kinds of millet a thick-grained pap called *couscous*, which is their common food.

HOLD, the whole interior cavity or belly of a ship, or all that part of her inside which is comprehended between the floor and the lower-deck throughout her whole length.—This capacious apartment usually contains the ballast, provisions, and stores of a ship of war, and the principal part of the cargo in a merchantman. The disposition of these articles with regard to each other, naturally falls under consideration in the article STOWAGE; it suffices in this place to say, that the places where the ballast, water, provisions, and liquors are stowed, are known by the general name of the *hold*. The several store-rooms are separated from each other by *bulk-heads*, and are denominated according to the articles which they contain, the *fail room*, the *bread-room*, the *fish-room*, the *spirit-room*, &c.

HOLDERNESS, a peninsula in the east-riding of Yorkshire, having the German sea on the east, and the Humber on the south. It has the title of an earldom.

HOLERACEÆ (from *holus*, "pot-herbs"). The name of the 12th order in Linneus's fragments of a natural method, consisting of plants which are used for the table, and enter into the economy of domestic affairs. See BOTANY, p. 1307.

HOLIBUT, in ichthyology. See PLEURONECTES.
HOLIDAY (Dr Barten), a learned divine and poet,

Holcus

Holiday.

Holiness

Holland.

Holland.

poet, was the son of a taylor in Oxford, and born there about the year 1593. He studied at Christ-church college, and in 1615 took orders. He was before admired for his skill in poetry and oratory; and now distinguishing himself by his eloquence and popularity as a preacher, he had two benefices conferred on him in the diocese of Oxford. In 1618, he went as chaplain to Sir Francis Stewart, when he accompanied count Gondomare to Spain. Afterwards he became chaplain to the king, and before the year 1626 was promoted to the archdeaconry of Oxford. In 1642 he was made doctor of divinity at Oxford; near which place he sheltered himself during the time of the rebellion; but after the restoration returned to his archdeaconry, where he died in 1661. His works are, 1. Twenty sermons, published at different times. 2. *Philosophie politico-barbara specimen*, quarto. 3. Survey of the world, a poem in ten books, octavo. 4. A translation of the satires of Juvenal and Persius. 5. Technogamia, or the marriage of the arts, a comedy.

HOLINESS, or SANCTITY; the quality which constitutes or denominates a person or thing *holy*; i. e. pure, or exempt from sin. The word is also used in respect of persons and things that are sacred, i. e. set apart to the service of God, and the uses of religion.

HOLINESS, is also a title or quality attributed to the pope; as that of *majesty* is to kings. Even kings, when writing to the pope, address him under the venerable appellation of *Your Holiness*, or *Holy Father*; in Latin, *Sanctissime* or *Beatissime Pater*. Anciently the same title was given to all bishops. The Greek emperors also were addressed under the title of *Holiness*, in regard of their being anointed with holy oil at their coronation. De Cange adds, that some of the kings of England have had the same attribute; and that the orientals have frequently refused it to the pope.

HOLINSHED (Raphael), an English historian famous for the *Chronicles* under his name, was descended from a family that lived at Bosely in Cheshire; but neither the time of his birth, nor scarcely any circumstances of his life are known. However, he appears to have been a man of considerable learning, and to have had a genius particularly adapted for history. His *Chronicles of England, Scotland, and Ireland*, were first published at London in 1570, in 2 vols folio; and then in 1587, in 3 vols. In this second edition several sheets in the 2d and 3d vols were caltreated for containing some passages disagreeable to queen Elizabeth and her ministers; but the caltreatments have since been printed apart. Holinshed was not the sole compiler of this work, being assisted in it by several other hands. The time of his death is unknown; but from his will, which is prefixed to Hearne's edition of *Cambden's Annals*, it appears to have happened between 1578 and 1582.

HOLLAND (Philemond), M. D. commonly called the *Translator general of his age*, was educated in the university of Cambridge. He was for many years a schoolmaster at Coventry, where he also practised physic. He translated Livy, Pliny's Natural History, Plutarch's Morals, Suetonius, Ammianus Marcellinus, Xenophon's Cyropædia, and Cambden's Britannia, into English; and the geographical part of Speed's Theatre of Great Britain, into Latin. The Britannia, to which he made many useful additions, was the

most valuable of his works. It is surprising, that a man of two professions could find time to translate so much; but it appears from the date of the Cyropædia, that he continued to translate till he was 80 years of age. He died in 1636, aged 85. He made the following epigram upon writing a large folio with a single pen:

With one sole pen I wrote this book,
Made of a grey goose quill;
A pen it was when it I took,
And a pen I leave it still.

HOLLAND, the largest of the seven United Provinces, divided into South and North Holland, the latter of which is also called *West Friesland*, is bounded on the west by the German ocean, or north sea; to the east by the Zuyder-see, the province of Utrecht, and part of Gelderland; to the south by Dutch Brabant and Zealand; and to the north by the Zuyder-see. Its greatest extent from north to south, including the island of Texel, is about 90 English miles; but from east to west its extent varies from 40 to 25. To defend it against the sea, dykes have been erected at an immense expence, and innumerable canals cut to drain it, as being naturally very low and marshy. Some parts of the province are very fruitful in corn; but the greater part consists of rich pastures, wherein are kept large herds of kine, which supply them with incredible quantities of butter and cheese. Of the latter, that of Edam, in North Holland, is highly esteemed. The many rivers and canals that intersect the province are of great advantage to its commerce, but contribute to render the air foggy and unwholesome. There is a communication by water betwixt almost every town and village. Towards the middle also of the province are great numbers of turf pits. It is so populous, that the number of the inhabitants is computed at 1,200,000. In point of cleanliness, no country surpasses, and few come up to it, especially in North Holland, and that even in the villages. From the counts of Holland this province devolved, in 1436, to the dukes of Burgundy, and from them to the house of Austria, along with the other provinces. The States of Holland and West Friesland are composed of the nobility and deputies of the towns: of the latter there are 18 that send deputies to the assembly of the states, which is held at the Hague. The grand pensionary is a person of great dignity and weight in this assembly, and his office requires extraordinary abilities. There are also two councils composed of deputies, one for South, and another for North Holland, who have the cognizance of the revenue and military affairs. The whole province sends one deputy from among the noblesse to the states-general, who takes precedence of all others, together with three or four more. There are two supreme courts of judicature for Holland and Zealand; viz. the great council of Holland and Zealand, and the hof or court of Holland. To these appeals lie from the towns; but the causes of noblemen come before them in the first instance. With respect to the ecclesiastical government, there is a synod held annually both in South and North Holland, of which the former contains eleven classes, and the latter six; and the ministers of both together amount to 331. In the whole province are 37 towns, 8 boroughs, and 400 villages.

HOLLAND, one of the divisions of Lincolnshire in

Holland.

England. It so much resembles the province of that name upon the continent, in most respects, being low and marshy, with the sea on one side, and canals running through it, that it must either have had its name from thence, or on the same account. On the east it has what the ancient geographers call *Æstuarium Mediaris*, now the Waddes, which are overflowed at high water, and part of Cambridgeshire on the south. The lower part of it is full of bogs and marshes, and has huge banks to defend it against the sea and land floods. The whole division seems to have been gained from the sea. The ground is so soft, that horses are worked unshod; and it produces plenty of grass, but little corn. Though there are no stones to be found in or upon the ground, yet the churches are all of stone. They have no fresh water but from the clouds, which is preserved in pits: but if these are deep, it soon turns brackish; and if they are shallow, they soon become dry.

New HOLLAND, the largest island in the world, reaching from 10 to 44 deg. S. lat. and between 110 and 154 of E. long. east from London. It received its name from having been chiefly explored by Dutch navigators. The land first discovered in those parts was called *Eendracht* (Concord) Land, from the name of the ship on board which the discovery was made, in 1616; 24 deg. and 25 deg. south. In 1618, another part of this coast, nearly in 15 deg. south, was discovered by Zeachen, who gave it the name of *Arnhems* and *Diemen*; though a different part from what afterwards received the name of Diemen's Land from Tasman, which is the southern extremity, in latitude 43 deg. In 1619, Jan Van Edels gave his name to a southern part of New-Holland. Another part, situated between 30 and 33 deg. received the name of *Leuven*. Peter Van Nuytz gave his name, in 1627, to a coast which communicates to Leuven's Land towards the westward; and a part of the western coast, near the tropic of Capricorn, bore the name of *De Wits*. In 1628, Peter Carpenter, a Dutchman, discovered the great gulph of Carpentaria, between 10 and 20 deg. south. In 1687, Dampier, an Englishman, sailed from Timor, and coasted the western parts of New-Holland. In 1699, he left England, with a design to explore this country, as the Dutch suppressed whatever discoveries had been made by them. He sailed along the western coast of it, from 28 to 15 deg. He saw the land of *Eendracht* and of *De Wit*. He then returned to Timor: from whence he went out again, examined the isles of Papua, coasted New-Guinea, discovered the passage that bears his name; called a great island which forms this passage, or strait, on the east side, *New-Britain*; and sailed back to Timor along New-Guinea. This is the same Dampier who, between 1683 and 1691, sailed round the world by changing his ships. This immense island, which many late writers have styled a continent from its extent, which is more than equal to the habitable parts of the continent of Europe, has been explored on the eastern coast with great perseverance and peril by captain Cook, in the Endeavour bark, 1770, to which he gave the name of *New South Wales*. Captain Furneaux, in the Adventure, attempted to discover the connection which Van Diemen's land bears to New-Holland; but the tempestuous weather which he had to contend with baffled

Holland.

all his attempts, and he was forced (not possessing the same ardour as his leader) to leave that point in the same indeterminate state as Tasman had before transmitted it. As this coast was explored to a very great extent, without much time being spent on any part of the country, or any friendly intercourse being established with the inhabitants, we shall follow the ship in its progress along the eastern coast, after describing the country and its inhabitants as fully as the lights which are thrown upon them will enable us.

This country is not mountainous; but chiefly consists of valleys and plains, rather barren than fruitful. The face of the country is much the best to the southward, the trees being taller, and the herbage richer; but no underwood was seen any where. The whole eastern coast is well watered by brooks and springs, but there are no great rivers. There are but two sorts of timber-trees, the gum-tree, and a kind of pine. Here is the palm-tree of three sorts. Though this country affords very few esculent plants, yet it abounds with such as gratify the curiosity of the naturalist. Here is an animal resembling a polecat, which the natives call *quill*; the back is brown, spotted with white, and the belly unmixt white. Here are many kinds of bats; also gulls, flags, so-called geese or gannets of two sorts, boobies, noddies, curlews, ducks, pelicans of an enormous size, among the water-fowl; crows, parrots, paroquets, cockatoos, and other birds of the same kind, of exquisite beauty, pigeons, doves, quails, butards, herons, cranes, hawks, and eagles, among the land-birds. Here are serpents, some of which are venomous, others harmless; scorpions, centipedes, and lizards. The most remarkable insect found in this country is the ant, of which there are several sorts. One is green, and builds its nest upon trees: These wonderful insects form their nests by bending down several leaves, each of which is as broad as a man's hands, and gluing the points of them together, so as to form a purse. The viscus used for this purpose is an animal-juice which nature has enabled them to elaborate. Thousands of these busy insects were seen uniting all their strength to hold the leaves in this position, while other busy multitudes were employed within, in applying the gluten that was to prevent their returning back. "To satisfy ourselves, (says captain Cook), that the leaves were bent and held down by the effort of these diminutive artificers, we disturbed them in their work; and as soon as they were driven from their station, the leaves on which they were employed sprung up with a force much greater than we could have thought them able to conquer by any combination of their strength. But tho' we gratified our curiosity at their expence, the injury did not go unrevenged; for thousands immediately threw themselves upon us, and gave us intolerable pain with their stings, especially those which took possession of our necks and our hair, from whence they were not easily driven. The sting was scarcely less painful than that of a bee; but except it was repeated, the pain did not last more than a minute." Another kind burrows in the root of a plant which grows on the bark of trees, in the manner of mistletoe. This root is commonly as big as a large turnip; when cut, it appears intersected by innumerable winding passages,

Holland.

ges, all filled with these animals; but notwithstanding, the vegetation of the plant suffers no injury. The insects are very small, not more than half as big as the common red ant in England. Their stings give no pain; but, by running about on the hands, and such parts of the body where they light, produce a titillation more intolerable than pain, if not excruciating. There is still another fort, possessing no power of tormenting; they resemble the white ants of the East-Indies. These construct nests on the branches of trees, three or four times as big as a man's head: the materials of these houses seem to be formed of small parts of vegetables kneaded together with a glutinous matter, with which nature has probably furnished them. Upon breaking the outside crust of this dwelling, innumerable cells, swarming with inhabitants, appear in a great variety of winding directions, all communicating with each other, and with several apertures that lead to other nests upon the same tree. They have also another house built upon the ground, generally at the root of a tree: it is formed like an irregularly sided cone; and sometimes is more than six feet high, and nearly as much in diameter. The outside of these is of well-tempered clay, about two inches thick; and within are the cells, which have no opening outward. Between these two dwellings, one of which is their summer and the other their winter residence, there is a communication by a large avenue, or covered way, leading to the ground, and by a subterranean passage. The structures on the ground are proof against any wet that can fall, which those on the trees are not, from the nature and thinness of their crust or wall.—The fish here are of kinds unknown to Europe, except the mullet, and some of the shell-fish. Upon the shoals and reef are great quantities of the finest green turtle in the world, and oysters of various kinds, particularly the rock-oyster and the pearl-oyster. In the rivers and salt creeks are alligators.

This extensive country appears to be very thinly inhabited: the natives never appeared in larger companies than thirty together. The inland parts are most probably quite uninhabited, as no part of the coast which was visited had any appearance of cultivation, and the miserable natives drew their subsistence from the sea. The only tribe with which any intercourse was established, consisted of twenty-one persons; twelve men, seven women, a boy and a girl. The women were never seen but at a distance; for when the men crossed the river to the ship, they left them behind. The men are of a middle size, and in general well made, clean-limbed, and remarkably vigorous, active, and nimble: their countenances were not altogether without expression, and their voices are remarkably soft and effeminate. They encrust their bodies with dirt, which makes them appear as black as negroes; their hair, which naturally grows long and black, they crop short; their beards grow bushy and thick, but they keep them short by fingering them. Neither sex have any sense of indecency in discovering their whole body. Here they perforate the cartilage that divides the nostrils from each other, through which they thrust a bone, which is as thick as a man's finger, and between five and six inches long; it reaches quite across the face, and so effectually stops

Holland.

up both the nostrils, that they are forced to keep their mouths wide open for breath, and snuffle so when they attempt to speak, that they are scarcely intelligible even to each other. Besides this nose-jewel, they have necklaces made of shells, very neatly cut and strung together; bracelets of small cord, wound two or three times round the upper part of their arm, and a string of plaited human hair, about as thick as a thread of yarn, tied round the waist. Besides these, some of them had gorgets of shells hanging round the neck, so as to reach cross the breast. They paint their bodies both white and red, and draw a circle of white round each eye. They have holes in their ears, but were not seen to wear any thing in them. They were so attached to their own ornaments, that they preferred them to any beads and ribbons that were offered them, though more showy, and regularly made. They received the things that were given them, but were insensible to all the signs which were made them that something was expected in return. Many of the trinkets that had been given them were afterwards found thrown negligently away in the woods, like the playthings of children, which please only while they are new. The bodies of many were marked with large scars, which appeared to be the remains of wounds that they had inflicted on themselves with some blunt instrument, and which they signified by signs to have been memorials of grief for the dead. There was no appearance of a town or village in the whole country. Their houses are formed without art or industry; some of them were just high enough for a man to stand upright in, but not large enough for him to extend his whole length in any direction: they are built with pliable rods, about as thick as a man's finger, in the form of an oven, by sticking the two ends into the ground, and covering them with palm-leaves and broad pieces of bark: the door is nothing but a large hole at one end. Under these houses or sheds they sleep, coiled up with their heels to their heads; in which position one shed will hold three or four persons: towards the northward, as the climate becomes hotter, these sheds were constructed much lighter: one side was entirely open, and none of them were more than four feet deep. These hovels were set up occasionally by a wandering herd, in any place that would furnish them for a time with subsistence, and left behind them when they removed to another spot. When they mean to continue only a night or two at one place, they sleep without any shelter except the bushes and grass, the latter of which is near two feet high. They have a vessel to hold the water they fetch from springs, made of bark, only by tying up the two ends with a withy, which not being cut off, serves for a handle. They have a small bag, about the size of a moderate cabbage-net, which the men carry upon their back by a string which passes over their heads. It generally contains a lump or two of paint and resin, some fish-hooks and lines, a shell or two, out of which their hooks are made, a few points of darts, and their usual ornaments; which is an inventory of the whole worldly treasure of the richest man among them. Their fish-hooks are very neatly made, and some of them are extremely small. For striking turtle, they have a peg of wood, which is about a foot long, and very well bearded;

Holland.

bearded; this fits into a socket at the end of a staff of light wood, about as thick as a man's wrist, and about seven or eight feet long. To the staff is tied one end of a loose line, about three or four fathoms long, the other end of which is fastened to the peg. To strike the turtle, the peg is fixed into the socket; and when it has entered his body, and is retained there by the barb, the staff flies off, and serves for a float to trace their victim in the water. It assists also to tire him, till they can overtake him with their canoes, and haul him ashore. One of these pegs was found buried in the body of a turtle, which had healed up over it. Their lines are made of the fibres of a vegetable, and are from the thickness of a half-inch rope to the fineness of a hair. They are unacquainted with the use of nets in fishing; and can only catch fish by striking them, or with a hook and line, or groping for them in the hollows of the rocks and shoals, which are dry at half-ebb. They bake their provisions by the help of hot stones, like the inhabitants of the South-sea islands. They produce fire with great facility, and spread it in a wonderful manner. To produce it, they take two pieces of dry, soft wood; one is a stick about eight or nine inches long, the other piece is flat. The stick they shape into an obtuse point at one end; and pressing it upon the other, turn it nimbly, by holding it between both their hands, as we do a chocolate-mill; often shifting their hands up, and then moving them down upon it, to increase the pressure as much as possible. By this method they get fire in less than two minutes, and from the smallest spark they increase it with great speed and dexterity. "We have often seen (says captain Cook) one of them run along the shore, to all appearance with nothing in his hand, who stooping down for a moment, at the distance of every fifty or an hundred yards, left fire behind him, as we could see, first by the smoke, and then by the flame along the drift of wood and other litter which was scattered along the place. We had the curiosity to examine one of these planters of fire when he set off, and we saw him wrap up a small spark in dry grass, which, when he had run a little way, having been fanned by the air that his motion produced, began to blaze; he then laid it down in a place convenient for his purpose, inclosing a spark of it in another quantity of grass, and so continued his course." Their weapons are spears or lances; some have four prongs pointed with bone, and barbed. To the northward, the lance has but one point; the shaft is made of cane, very straight and light, and from eight to fourteen feet long, consisting of several joints, where the pieces are let into each other and bound together. The points of these darts are either of hard heavy wood, or bones of fish: those points that are of wood, are also sometimes armed with sharp pieces of broken shells, which were stuck in, and at the junctures covered with resin. The lances which are thus barbed, are indeed dreadful weapons, as they cannot be drawn out of a wound without tearing away the flesh, or leaving the sharp ragged splinters of the bone or shell which forms the barb behind them in the wound. The canoes to the northward are not made of bark, but of the trunk of a tree, hollowed probably by fire: none of these boats will carry more than four people. The only tools seen

among them were, an adze wretchedly made of stone, some small pieces of the same substance in form of a wedge, a wooden mallet, and some shells and fragments of coral. It is difficult to account for the small number of the human species which are found dispersed over this country; whether they are thinned by civil broils, excited by the horrid appetite for devouring each other that prevails in New Zealand, or that their population is prevented by any other causes, cannot be ascertained. Their total ignorance of every method to procure the comforts of life, both from the cultivation of the ground, and furnishing materials for clothing and fishing, place them among the lowest of the human species.

HOLLAND in commerce, a fine and close kind of linen, so called from its being first manufactured in Holland.

HOLLAR (Wenceslaus), a celebrated engraver, born at Prague, in 1607. He employed himself chiefly in copying portraits; and his delicate little views of many of the cities in Germany, got him such reputation, that the earl of Arundel our ambassador at the Imperial court brought him over to England. Here he executed several plates from the fine Arundelian collection of paintings, engraved many landscapes and views about London, and of London itself, as well before as after the great fire: but it being his fate to work chiefly for printfellers and booksellers, in a state of subordination, more for the profit of his employers than for himself; so he could not even in his old age keep clear of the encumbrances of debt. About the year 1672, he travelled northward, and took views of towns, castles, churches and tombs, that would prove almost endless to enumerate. Few artists have been able to imitate his works, and the lovers of art are always zealous to collect them. It is melancholy to add, that on the verge of his 70th year, he was attached with an execution at his lodgings in Gardener's lane, Westminster; when he desired only the liberty of dying in his bed, and that he might not be removed to any other prison than the grave: a favour which it is uncertain whether he obtained or not. He died, however, in 1677.—The merits of this artist are thus characterized in the *Essay on Prints*: "Hollar gives us views of particular places, which he copies with great truth, unornamented, as he found them. If we are satisfied with exact representations, we have them no where better than in Hollar's works: but if we expect pictures, we must seek them elsewhere. Hollar was an antiquarian, and a draughtsman; but seems to have been little acquainted with the principles of painting. Stiffness is his characteristic, and a painful exactness void of taste. His larger views are mere plans. In some of his smaller, at the expence of infinite pains, something of an effect is sometimes produced. But in general, we consider him as a repository of curiosities, a record of antiquated dresses, abolished ceremonies, and edifices now in ruins."

HOLLES (Thomas Pelham), duke of Newcastle, was born in 1693, and succeeded his father as baron Pelham of Loughton: by the last will of his uncle John Holles duke of Newcastle, who died in 1711, he was adopted heir to his great estate, and empowered to bear the arms and name of *Holler*, together with the title of *duke of Newcastle upon Tyne*. His power and interest

Hollar

Holles.

Holloa
Hollstein.

interest were now very great, and he exerted both in supporting George I. against the Tory party that opposed him. The whole weight of authority had for some time been in the hands of the Tories at the accession of this king, while the Whigs remained without credit or influence; but this state of affairs was now reversed; and the duke of Newcastle, among the rest, was distinguished by the royal favour. He was created duke of Newcastle-under-Lyne, with remainder to the female issue of his brother the honourable Henry Pelham; was made lord chamberlain of the king's household, and a knight of the garter; and was one of the peers commissioned to sign the quadruple alliance in 1718. In 1724, he resigned the place of lord chamberlain, and was appointed secretary of state. It would be tedious to trace him farther through his places and honours: it need therefore only be added, that after his long services to the crown, he gave way to lord Bute, who succeeded him in 1762 as first lord of the treasury. Quitting now the fatigues of business, he lived in retirement to his death in 1768, leaving the character of a most disinterested patriot; having greatly impoverished his private estate during his public services, and retiring without accepting any pension.

HOLLOA, in the sea-language, an exclamation of answer, to any person who calls to another to ask some question, or to give a particular order. Thus, if the master intends to give any order to the people in the main-top, he previously calls, *Main-top, boy!* to which they answer, *Holloa!* to shew that they hear him, and are ready. It is also the first answer in hailing a ship at a distance. See **HAILING**.

HOLLY, in botany. See **ILEX**.

Sea-HOLLY. See **ERYNGIUM**.

HOLM (Sax. *hulmus*, *insula amnica*), an isle or fenny ground, according to Bede; or a river island. And where any place is called by that name, and this syllable is joined with any other in the names of places, it signifies a place surrounded with water; as the *Flatholmes* and *Stepholmes* in the Severn near Bristol; but if the situation of the place is not near the water, it may then signify a hilly place; *holm*, in Saxon, signifying also a hill or cliff.

HOLocaust, a burnt-offering, or sacrifice, wholly consumed by fire: of this kind was the daily sacrifice in the Jewish church. This was done by way of acknowledgment, that the person offering and all that belonged to him were the effects of the divine bounty.

HOLOGRAPH, among civilians, a will wholly written by the hand of the testator.

HOLSTEIN, a duchy of Germany, bounded by the German ocean on the west; the Baltic, or the gulph of Lubeck, on the east; the duchy of Mecklenburg, on the south-east; that of Bremen, with the river Elbe, on the south-west; and Laueburg, with the territory of Hamburg, on the south. Its greatest length is about 80 miles, and its breadth 60. The diocese of Eutin, and the county of Ranzau, though they make a part of the duchy of Holstein, yet being lands belonging to the empire and circle, shall be described separately.

A great part of this country consists of rich marsh-land, which being much exposed to inundations both

Holstein.

from the sea and rivers, dykes have been raised at a great expence, to guard and defend them. The pastures in the marshes are so rich, that cattle are bred in vast numbers and fattened in them, and great quantities of excellent butter and cheese made of their milk. They are also very fruitful in wheat, barley, pease, beans, and rape-seed. In the more barren, sandy, and heathy parts of the country, large flocks of sheep are bred and fed: nor are orchards wanting, or woods, especially of oak and beech; nor turk, poultry, game, and wild-fowl. Here is a variety both of sea and river fish; and the beef, veal, mutton, and lamb, are very fat and palatable. Holstein is also noted for beautiful horses. The gentry usually farm the cows upon their estates to a Hollander, as he is called, who for every cow pays from six to ten rix-dollars; the owner providing pasture for them in summer, and straw and hay in winter. It is no uncommon thing here, to drain the ponds and lakes once in three or four years, and sell the carp, lampreys, pikes, and perch, found in them; then sow them for several years after with oats, or use them for pasture; and after that, lay them under water again, and breed fish in them. There are hardly any hills in the country; but several rivers, of which the principal are the Eyder, the Stor, and the Trave. The duchy contains about 30 towns great and small: most part of the peasants are under villenage, being obliged to work daily for their lords, and not even at liberty to quit their estates. The nobility and the proprietors of manors are possessed of the civil and criminal jurisdiction, with other privileges and exemptions. Formerly there were diets, but now they seem to be entirely laid aside: meetings, however, of the nobility are still held at Kiel. The predominant religion here is Lutheranism, with superintendencies as in other Lutheran countries. In several places the Jews are allowed the exercise of their religion. At Gluckstadt, and Altena, are both Calvinist and Popish churches; and at Kiel, a Greek Russian chapel. Besides the Latin schools in the towns, at Altena is a gymnasium, and at Kiel an university. Notwithstanding this country's advantageous situation for commerce there are few manufactures and little trade in it. Hamburg and Lubeck supply the inhabitants with what they want from abroad; from whence and Altena, they export some grain, malt, groats, starch, buck-wheat, pease, beans, rappedseed, butter, cheese, sheep, swine, horned cattle, horses, and fish. The manufactures of the duchy are chiefly carried on at Altena, Kiel, and Gluckstadt. The duchy of Holstein, consists of the ancient provinces of Holstein, Stormar, Ditmarsh, and Wagria. It belongs partly to the king of Denmark, and partly to the dukes of Holstein Gottorf and Ploen. Anciently the counts of Holstein were vassals of the dukes of Saxony; but afterwards they received the investiture of their territories from the emperor, or the bishops of Lubeck in the emperor's name, though now the investiture is given by the emperor in person. The king of Denmark appoints a regency over his part of Holstein and the duchy of Sleswick, which has its office at Gluckstadt. The seat of the great duke's privy council, and regency-court, together with the chief consistory, which is united to it, is at Kiel: there are

many.

Holstein
Holt.

many inferior courts and consistories, from which an appeal lies to the higher. In the duchy of Holstein, the government of the convents and nobility is alternately in the king and duke, for a year, from Michaelmas to Michaelmas. The person in whom the government is lodged, administers it by his regency. In some cases an appeal lies from this court to the Aulic council or chamber at Wetzlar: the convents, the nobility, and the proprietors of manors in the country, have a civil and criminal jurisdiction over their estates. The revenues of the sovereigns arise principally from their demesnes and regalia; besides which, there is a land and several other taxes and imposts. The duke's income, setting aside his ducal patrimony, has been estimated at 70,000 or 80,000 pounds. The king usually keeps here some regiments of foot and one of horse. With respect to the duke's military force, it amounts to about 800 men. The king, on account of his share in this country, styles himself *duke of Holstein, Stormar, and Ditmarsch*. The dukes, both of the royal and princely house, style themselves *heirs of Norway, dukes of Slefwick, Holstein, Stormar, and Ditmarsch*, and counts of *Oldenburg and Delmenhorst*. On account of Holstein, both the king of Denmark and the grand duke have a seat and voice in the college of the princes of the empire, and in that of the circle. Together with Mecklenburg they also nominate an assessor for this circle in the Aulic chamber. The matricular assessment of the whole duchy is 40 horse and 80 foot, or 800 florins; to the chamber of Wetzlar both princes pay 189 rix-dollars, 31 kruitzeners. In 1735, duke Charles Frederic, of Holstein Gottorf, founded an order of knighthood here, viz. that of St Anne, the ensign of which is a red cross, enamelled, and worn pendant at a red ribbon edged with yellow.—The principal places of that part of the duchy belonging to the king of Denmark and the duke of Ploen are Gluckstadt, Itzhoë, Rendsburg, and Ploen; and that part belonging to the great duke are Kiel, Oldenburgh, Preetz, and Altena.

HOLSTENIUS (Lucas), an ingenious and learned German, born at Hamburg in 1596, was bred a Lutheran; but being converted to popery by father Sirmond the Jesuit, he went to Rome, and attached himself to cardinal Francis Barberini, who took him under his protection. He was honoured by three popes; Urban VIII. gave him a canonry of St Peter's; Innocent X. made him librarian of the Vatican; and Alexander VII. sent him in 1655 to queen Christina of Sweden, whose formal profession of the Catholic faith he received at Inspruck. He spent his life in study, and was very learned both in sacred and profane antiquity. He died in 1661; and though he was not the author of any great works, his notes and dissertations on the works of others have been highly esteemed for the judgment and precision with which they are drawn up.

HOLT (Sir John), knight, eldest son of Sir Thomas Holt, serjeant at law, was born in 1642. He entered himself of Gray's Inn in 1658; and applied to the common law with so much industry, that he soon became a very eminent barrister. In the reign of James II. he was made recorder of London, which office he discharged with much applause for about a year and a half; but lost his place for refusing to expound

the law suitably to the king's designs. On the arrival of the prince of Orange, he was chosen a member of the convention parliament, which afforded him a good opportunity of displaying his abilities; so that as soon as the government was settled, he was made lord chief justice of the court of king's bench, and a privy councillor. He continued chief justice for 22 years, with great repute for steadiness, integrity, and thorough knowledge in his profession. Upon great occasions he asserted the law with intrepidity, though he thereby ventured to incur by turns the indignation of both the houses of parliament. He died in 1709, and published some reports.

HOLT (Sax.) "a wood;" wherefore the names of towns beginning or ending with *holt*, as *buck-holt*, &c. denote that formerly there was great plenty of wood in those places.

HOLY-GHOST, one of the persons of the holy Trinity. See GOD and TRINITY.

Order of the HOLY-GHOST, the principal military order in France, instituted by Henry III. in 1569. It consists of 100 knights, who are to make proof of their nobility for three descents. The king is the grand-master, or sovereign; and as such, takes an oath, on his coronation-day, to maintain the dignity of the order.

The knights wear a golden-cross, hung about their necks by a blue silk ribbon, or collar. But before they receive the order of the Holy-ghost, that of St Michael is conferred as a necessary degree; and for this reason their arms are surrounded with a double collar.

HOLYHEAD, a town and cape of the isle of Anglesea in Wales, and in the Irish channel, where people usually embark for Dublin, there being three packet-boats that sail for that city every Monday, Wednesday, and Friday, wind and weather permitting. It has a very convenient harbour for the northern trade, when taken short by contrary winds. If this was properly repaired, and warehouses built, it would be very convenient for the Irish, to import such of their goods as pay English duty, it being but a few hours sail from Dublin. Besides, the Dublin merchants might come over with the packets, to see their goods loaded. The commodities are, butter, cheese, bacon, wild-fowl, lobsters, crabs, oysters, razor-fish, shrimps, herrings, cod-fish, whiting, whiting-pollacks, cole-fish, sea-teaches, turbot, soles, flounders, rays, and plenty of other fish. On the rocks the herb grows of which they make kelp, a fixed salt used in making glass, and in alum works. In the neighbourhood there is a large vein of white fullers earth, and another of yellow which might be useful to fullers. On the isle of Skerries, nine miles to the north, is a light-house, which may be seen 24 miles off. Large flocks of puffins are often seen here; they all come in one night, and depart in the same manner. W. Long. 4. 40. N. Lat. 53. 20.

Holy-Island, a small island lying on the coast of England, six miles south of Berwick, in Northumberland. It is not above two miles and a quarter in length, nor much above a mile in breadth. The soil is rocky and full of stones, for which reason it is thinly peopled: it has but one town, with a church, and a castle, under which there is a commodious harbour, defended by a block-house.

Holy
Ghost
Holy-
Island.

Holywell
Homberg.

HOLYWELL, a town of North Wales, in the county of Flint. It is a place of great note, for the well of St Winnifrid, who is reputed a virgin martyr; and it is much frequented by people that come to bathe in it, as well as by popish pilgrims out of devotion. The spring gushes forth with such impetuosity, that at a small distance it turns several mills. Over the spring is a chapel built upon pillars, and on the windows are painted the history of St Winnifrid's life. There is a moat about the well, which some foolishly imagine to be St Winnifrid's hair. W. Long. 3. 15. N. Lat. 54. 23.

HOLYOAK (Francis), author of the Latin dictionary, became rector of South-ham in Warwickshire in 1604; and being greatly esteemed, was chosen member of the convocation in the first year of Charles I.'s reign. He suffered much for the king; and died in 1653, aged 87. His son Thomas made enlargements to the said Dictionary.

HOLYWOOD (John), or HALIFAX, of *Sacro-bosco*, was, according to Leland, Bale, and Pitts, born at Halifax in Yorkshire; according to Stainhurst, at Holywood near Dublin; and, according to Dempster and Mackenzie, in Nithsdale in Scotland. The last-mentioned author informs us, that, having finished his studies, he entered into orders, and was made a canon regular of the order of St Augustin in the famous monastery of Holywood in Nithsdale. The English biographers, on the contrary, tell us, that he was educated at Oxford. They all agree, however, in asserting that he spent most of his life at Paris; where, says Mackenzie, he was admitted a member of the university on the fifth of June in the year 1221, under the syndics of the Scotch nation; and soon after, elected professor of mathematics, which he taught for many years with applause. We are told by the same author, that he died in 1256, as appears from the inscription on his monument in the cloisters of the convent of St Maturine at Paris. Holywood was certainly the first mathematician of his time. He was cotemporary with Roger Bacon, but probably older by about 20 years. He wrote, 1. *De sphaera mundi*; often reprinted, and illustrated by various commentators. 2. *De anni ratione, seu de computo ecclesiastico*. 3. *De algorismo*, printed with *Comm. Petri Circilli Hisp.* Paris 1498.

HOMAGE, in law, is the submission, loyalty, and service, which a tenant promised to his lord, when he was first admitted to the land which he held of the lord in fee: also that owing to a king, or to any superior.

HOMBERG (William), a celebrated physician, chemist, and philosopher, was the son of a Saxon gentleman, and born in Batavia, in the East Indies, in 1652. His father afterwards settling at Amsterdam, William there prosecuted his studies; and from thence removed to Jena, and afterwards to Leipzig, where he studied the law. In 1642, he was made advocate at Magdeburg, and there applied himself to the study of experimental philosophy. Some time after, he travelled into Italy; and applied himself to the study of medicine, anatomy, and botany, at Padua. He afterwards studied at Bologna; and at Rome learned optics, painting, sculpture, and music. He at length travelled into France, England, and Holland; obtained the degree of doctor of physic at Wittemberg; travelled into Germany and the North; visited the mines of Saxony, Bohemia, Hungary, and Sweden; and re-

Vol. V.

turned to France, where he acquired the esleem of the learned. He was on the point of returning into Germany, when M. Colbert being informed of his merit, made him such advantageous offers, as induced him to fix his residence at Paris. M. Homberg, who was already well known for his phosphorus, for a pneumatic machine of his own invention more perfect than that of Guericke, for his microscopes, for his discoveries in chemistry, and for the great number and variety of his curious observations, was received into the academy of sciences in 1691, and had the laboratory of that academy, of which he was one of its principal ornaments. The duke of Orleans, afterwards regent of the kingdom, at length made him his chemist, settled upon him a pension, gave him the most superb laboratory that was ever in the possession of a chemist, and in 1704 made him his first physician. He had abjured the Protestant religion in 1682, and died in 1715. There are a great number of learned and curious pieces of his writing, in the memoirs of the academy of sciences, and in several journals. He had begun to give the elements of chemistry in the memoirs of the academy, and the rest were found among his papers fit for printing.

HOMBERG, a town of Germany, in the circle of the Upper Rhine, and landgrate of Hesse, seated ten miles north of Frankfurt, and gives title to one of the branches of the house of Hesse, who is its sovereign. E. Long. 8. 24. N. Lat. 50. 20.

HOMBERG, a town of Germany, in the palatinate of the Rhine, and duchy of Deuxponts. E. Long. 7. 6. N. Lat. 49. 20.

HOMER, the prince of the Greek poets, flourishing, according to Dr Blair, about 900 B. C. according to Dr Pristley 850, according to the Arundelian marbles 300, after the taking of Troy; and agreeable to them all, above 400 years before Plato and Aristotle. Seven cities disputed the glory of having given him birth, viz. Smyrna, Rhodes, Colophon, Salamis, Chios, Argos, and Athens; which has been expressed by the following distich:

Smyrna, Rhodes, Colophon, Salamis, Chios, Argos, Athenae;
Orbis de patria certat, Homerus, tua.

We have nothing that is very certain in relation to the particulars of his life. The most regular account is that which goes under the name of Herodotus, and is usually printed with his history: and though it is generally supposed to be a spurious piece, yet as it is ancient, was made use of by Strabo, and exhibits that idea which the later Greeks, and the Romans in the age of Augustus, entertained of Homer, we must content ourselves with giving an abstract of it.

A man of Magnesia, whose name was *Menaliippus*, went to settle at Cumæ, where he married the daughter of a citizen called *Homyrer*, and had by her a daughter called *Critheis*. The father and mother dying, the young woman was left under the tuition of Cleonax her father's friend, and suffering herself to be deluded was got with child. The guardian, though his care had not prevented the misfortune, was however willing to conceal it; and therefore sent Critheis to Smyrna, which was then building, 18 years after the founding of Cumæ; and about 168 after the taking of Troy. Critheis being near her time, went one day to a festival, which the town of Smyrna was celebra-

21 D

ting

Homberg,
Homers.

Homer.

ting on the banks of the river Meles; where her pains coming upon her, she was delivered of Homer, whom she called *Melēsignes*, because he was born on the banks of that river. Having nothing to maintain her, she was forced to spin; and a man of Smyrna called *Phemius*, who taught literature and music, having often seen Critheis, who lodged near him, and being pleased with her housewifery, took her into his house to spin the wool he received from his scholars for their schooling. Here she behaved herself so modestly and discreetly, that Phemius married her; and adopted her son, in whom he discovered a wonderful genius, and the best natural disposition in the world. After the death of Phemius and Critheis, Homer succeeded to his father-in-law's fortune and school; and was admired, not only by the inhabitants of Smyrna, but by strangers, who resorted from all parts to that place of trade. A shipmaster called *Mentes*, who was a man of learning and a lover of poetry, was so taken with Homer, that he persuaded him to leave his school, and to travel with him. Homer, who had then begun his poem of the *Iliad*, and thought it of great consequence to see the places he should have occasion to treat of, embraced the opportunity. He embarked with Mentes, and during their several voyages never failed carefully to note down all that he thought worth observing. He travelled into Egypt; from whence he brought into Greece the names of their gods, the chief ceremonies of their worship, and a more improved knowledge in the arts than what prevailed in his own country. He visited Africa and Spain; in his return from whence he touched at Ithaca, where he was much troubled with a rheum falling upon his eyes. Mentes being in haste to take a turn to Leucadia his native country, left Homer well recommended to Mentor, one of the chief men of the island of Ithaca, who took all possible care of him. There Homer was informed of many things relating to Ulysses, which he afterwards made use of in composing his *Odyssey*. Mentes returning to Ithaca, found Homer cured. They embarked together; and after much time spent in visiting the coasts of Peloponnesus and the islands, they arrived at Colophon, where Homer was again troubled with the distemper upon his eyes, which proved so violent, that he is said to have lost his sight. This misfortune made him resolve to return to Smyrna, where he finished his *Iliad*. Some time after, the ill posture of his affairs obliged him to go to Cumæ, where he hoped to have found some relief. Here his poems were highly applauded: but when he proposed to immortalize their town, if they would allow him a salary, he was answered, that "there would be no end of maintaining all the *ὄψωνοι*, or blind men;" and hence got the name of *Homer*. He afterwards wandered through several places, and stopped at Chios, where he married, and composed his *Odyssey*. Some time after, having added many verses to his poems in praise of the cities of Greece, especially of Athens and Argos, he went to Samos, where he spent the winter, singing at the houses of the great men, with a train of boys after him. From Samos he went to Io, one of the Sporades, with a design to continue his voyage to Athens; but landing by the way at Chios, he fell sick, died, and was buried on the sea-shore.

The only incontestable works which Homer has left

behind him are the *Iliad* and *Odyssey*. The *Batrachomyomachia*, or battle of the frogs and mice, has been disputed. The hymns have been disputed also, and attributed by the scholiasts to Cynæthos the rhapsodist: but neither Thucydides, Lucian, nor Paulanias, have scrupled to cite them as genuine. Many other pieces are ascribed to him: epigrams, the *Eartiges*, the *Cecropes*, the destruction of *Oechalia*, of which only the names are remaining.

Nothing was ever comparable to the clearness and majesty of Homer's style; to the sublimity of his thoughts; to the strength and sweetness of his verses. All his images are striking; his descriptions just and exact; the passions so well expressed, and nature so finely painted, that he gives to every thing motion, life, and action. But he more particularly excels in invention, and in the different characters of his heroes, which are so varied, that they affect us in an inexpressible manner. In a word, the more he is read by a person of good taste, the more he is admired. Nor are his works to be esteemed merely as entertaining poems, or as the monuments of a sublime and varied genius. He was in general so accurate with respect to costume, that he seldom mentioned persons or things that we may not conclude to have been known during the times of which he writes; and it was Mr Pope's opinion, that his account of people, princes, and countries, was purely historical, founded on the real transactions of those times, and by far the most valuable piece of history and geography left us concerning the state of Greece in that early period. His geographical divisions of that country were thought so exact, that we are told of many controversies concerning the boundaries of Grecian cities which have been decided upon the authority of his poems.

Alcibiades gave a rhetorician a box on the ear for not having Homer's writings in his school. Alexander was ravished with them, and commonly placed them under his pillow with his sword: he inclosed the *Iliad* in the precious casket that belonged to Darius; "in order, (said he to his courtiers), that the most perfect production of the human mind might be inclosed in the most valuable casket in the world." And one day seeing the tomb of Achilles in Sigæa, "Fortunate hero! (cried he), thou hast had a Homer to sing thy victories!" Lycurgus, Solon, and the kings and princes of Greece, set such a value on Homer's works, that they took the utmost pains in procuring correct editions of them, the most esteemed of which is that of Aristarchus. Didymus was the first who wrote notes on Homer; and Eustathius, archbishop of Thessalonica, in the 12th century, is the most celebrated of his commentators. Mr Pope has given an elegant translation of the *Iliad*, adorned with the harmony of poetic numbers; and Mad. Dacier has translated both the *Iliad* and *Odyssey* in prose. But those who desire to know the several editions of Homer, and the writers who have employed themselves on the works of that great poet, may consult Fabricius, in the first volume of his *Bibliotheca Græca*.

HOMICIDE, signifies in general, the taking away of any person's life. It is of three kinds; *justifiable*, *excusable*, and *felonious*. The first has no share of guilt at all; the second very little; but the third is the highest crime against the law of nature, that man is

Homer.
Homicide.

Homicide. capable of committing.

I. Justifiable homicide is of divers kinds.

1. Such as is owing to some unavoidable necessity, without any will, intention, or desire, and without any inadvertence or negligence, in the party killing, and therefore without any shadow of blame; as, for instance, by virtue of such an office as obliges one, in the execution of public justice, to put a malefactor to death, who hath forfeited his life by the laws and verdict of his country. This is an act of necessity, and even of civil duty; and therefore not only justifiable, but commendable, where the law requires it. But the law must require it, otherwise it is not justifiable: therefore wantonly to kill the greatest of malefactors, a felon or a traitor, attainted or outlawed, deliberately, uncompelled, and extrajudicially, is murder. And farther, if judgment of death be given by a judge not authorized by lawful commission, and execution is done accordingly, the judge is guilty of murder. Also such judgment, when legal, must be executed by the proper officer, or his appointed deputy; for no one else is required by law to do it, which requisition it is that justifies the homicide. If another person doth it of his own head, it is held to be murder: even though it be the judge himself. It must farther be executed, *servato juris ordine*; it must pursue the sentence of the court. If an officer beheads one who is adjudged to be hanged, or vice versa, it is murder: for he is merely ministerial, and therefore only justified when he acts under the authority and compulsion of the law. But, if a sheriff changes one kind of punishment for another, he then acts by his own authority, which extends not to the commission of homicide: and besides, this licence might occasion a very gross abuse of his power. The king indeed may remit part of a sentence, as in the case of treason, all but the beheading: but this is no change, no introduction of a new punishment; and in the case of felony, where the judgment is to be hanged, the king (it hath been said) cannot legally order even a peer to be beheaded.

Again: In some cases homicide is justifiable, rather by the permission, than by the absolute command, of the law: either for the advancement of public justice, which without such indemnification would never be carried on with proper vigour; or, in such instances where it is committed for the prevention of some atrocious crime, which cannot otherwise be avoided.

2. Homicides, committed for the advancement of public justice, are, 1. Where an officer, in the execution of his office, either in a civil or criminal case, kills a person that assaults and resists him. 2. If an officer, or any private person, attempts to take a man charged with felony, and is resisted; and, in the endeavour to take him, kills him. 3. In case of a riot, or rebellious assembly, the officers endeavouring to disperse the mob are justifiable in killing them, both at common law, and by the riot act, 1 Geo. I. c. 5. 4. Where the prisoners in a gaol, or going to gaol, assault the gaoler or officer, and he in his defence kills any of them, it is justifiable, for the sake of preventing an escape. 5. If trespassers in forests, parks, chafes, or warrens, will not surrender themselves to the keepers, they may be slain; by virtue of the statute 21 Edward I. ft. 2. *de malefactoribus in parci*, and 3 & 4 W. & M. c. 10. But, in all these cases, there

must be an apparent necessity on the officer's side; viz. that the party could not be arrested or apprehended, the riot could not be suppressed, the prisoners could not be kept in hold, the deer-stealers could not but escape, unless such homicide were committed: otherwise, without such absolute necessity, it is not justifiable. 6. If the champions in a trial by battle killed either of them the other, such homicide was justifiable, and was imputed to the just judgment of God, who was thereby presumed to have decided in favour of the truth.

3. In the next place, such homicide as is committed for the prevention of any forcible and atrocious crime, is justifiable by the law of nature; and also by the law of England, as it stood so early as the time of Bracton, and as it is since declared by stat. 24 H. VIII. c. 5. If any person attempts a robbery or murder of another, or attempts to break open a house in the night-time, (which extends also to an attempt to burn it,) and shall be killed in such attempt, the slayer shall be acquitted and discharged. This reaches not to any crime unaccompanied with force, as picking of pockets; or to the breaking open of any house in the day-time, unless it carries with it an attempt of robbery also. So the Jewish law, which punished no theft with death, makes homicide only justifiable in case of nocturnal house-breaking: "if a thief be found breaking up, and he be smitten that he die, no blood shall be shed for him: but if the sun be risen upon him, there shall blood be shed for him; for he should have made full restitution." At Athens, if any theft was committed by night, it was lawful to kill the criminal, if taken in the fact: and, by the Roman law of the twelve tables, a thief might be slain by night with impunity; or even by day, if he armed himself with any dangerous weapon: which amounts very nearly to the same as is permitted by our own constitutions.

The Roman law also justifies homicide, when committed in defence of the chastity either of one's self or relations: and so also, according to Selden, stood the law in the Jewish republic. The English law likewise justifies a woman killing one who attempts to ravish her: and so too the husband or father may justify killing a man, who attempts a rape upon his wife or daughter; but not if he takes them in adultery by consent; for the one is forcible and felonious, but not the other. And there is no doubt but the forcibly attempting a crime, of a still more detestable nature, may be equally resisted by the death of the unnatural aggressor. For the one uniform principle that runs through our own, and all other laws, seems to be this: That where a crime, in itself capital, is endeavoured to be committed by force, it is lawful to repel that force by the death of the party attempting. But we must not carry this doctrine to the same visionary length that Mr Locke does; who holds, "that all manner of force without right upon a man's person, puts him in a state of war with the aggressor; and, of consequence, that, being in such a state of war, he may lawfully kill him that puts him under this unnatural restraint." However just this conclusion may be in a state of uncivilized nature, yet the law of England, like that of every other well-regulated community, is too tender of the public peace, too careful of

Homicide⁶Exodus
xxii. 2.

the lives of the subjects, to adopt so contentious a system; nor will suffer with impunity any crime to be prevented by death, unless the same, if committed, would also be punished by death.

In these instances of justifiable homicide, it may be observed, that the slayer is in no kind of fault whatsoever, not even in the minutest degree; and is therefore to be totally acquitted and discharged, with commendation rather than blame. But that is not quite the case in excusable homicide, the very name whereof imports some fault, some error, or omission; so trivial, however, that the law excuses it from the guilt of felony, though in strictness it judges it deserving of some little degree of punishment.

II. Excusable homicide is of two sorts; either *per infortunium*, by misadventure; or *se defendendo*, upon a principle of self-preservation. We will first see wherein these two species of homicide are distinct, and then wherein they agree.

1. Homicide *per infortunium*, or misadventure, is where a man, doing a lawful act, without any intention of hurt, unfortunately kills another: as where a man is at work with a hatchet, and the head thereof flies off and kills a slander-by; or, where a person, qualified to keep a gun, is shooting at a mark, and undesignedly kills a man: for the act is lawful, and the effect is merely accidental. So where a parent is moderately correcting his child, a master his apprentice or scholar, or an officer punishing a criminal, and happens to occasion his death, it is only misadventure; for the act of correction was lawful: but if he exceeds the bounds of moderation, either in the manner, the instrument, or the quantity of punishment, and death ensues, it is manslaughter at least, and in some cases (according to the circumstances) murder; for the act of immoderate correction is unlawful. Thus by an edict of the emperor Constantine, when the rigour of the Roman law with regard to slaves began to relax and soften, a master was allowed to chastise his slave with rods and imprisonment, and, if death accidentally ensued, he was guilty of no crime: but if he struck him with a club or a stone, and thereby occasioned his death; or if in any other yet grosser manner "*innoderate suo jure utatur, tunc reus homicidii fit.*"

But, to proceed. A tilt or tournament, the martial diversion of our ancestors, was however an unlawful act; and so are boxing and sword-playing, the succeeding amusement of their posterity: and therefore, if a knight in the former case, or a gladiator in the latter, be killed, such killing is felony of manslaughter. But if the king command or permit such diversion, it is said to be only misadventure; for then the act is lawful: In like manner as, by the laws both of Athens and Rome, he who killed another in the *pancratium*, or public games, authorised or permitted by the state, was not held to be guilty of homicide. Likewise to whip another's horse, whereby he runs over a child and kills him, is held to be accidental in the rider, for he has done nothing unlawful; but manslaughter in the person who whipped him, for the act was a trespass, and at best a piece of idleness, of inevitably dangerous consequence. And in general, if death ensues in consequence of an idle, dangerous, and unlawful sport, as shooting or casting stones in a town, or the barbarous diversion of cock-throwing; in

these and similar cases, the slayer is guilty of manslaughter, and not misadventure only; for these are unlawful acts.

2. Homicide in *self-defence*, or *se defendendo*, upon a sudden affray, is also excusable rather than justifiable, by the English law. This species of self-defence must be distinguished from that just now mentioned, as calculated to hinder the perpetration of a capital crime; which is not only a matter of excuse, but of justification. But the self-defence which we are now speaking of, is that whereby a man may protect himself from an assault, or the like, in the course of a sudden brawl or quarrel, by killing him who assaults him. And this is what the law expresses by the word *chance-medley*, or (as some rather choose to write it) *chaud-medley*; the former of which in its etymology signifies a casual affray, the latter an affray in the heat of blood or passion: both of them of pretty much the same import; but the former is in common speech too often erroneously applied to any manner of homicide by misadventure; whereas it appears by the statute 24 H. VIII. c. 5. and our ancient books, that it is properly applied to such killing as happens in self-defence upon a sudden encounter. The right of natural defence does not imply a right of attacking: for, instead of attacking one another for injuries past or impending, men need only have recourse to the proper tribunals of justice. They cannot therefore legally exercise this right of preventive defence, but in sudden and violent cases; when certain and immediate suffering would be the consequence of waiting for the assistance of the law. Wherefore, to excuse homicide by the plea of self-defence, it must appear that the slayer had no other possible means of escaping from his assailant.

In some cases this species of homicide (upon *chance-medley* in self-defence) differs but little from manslaughter, which also happens frequently upon *chance-medley* in the proper legal sense of the word. But the true criterion between them seems to be this; when both parties are actually combating at the time when the mortal stroke is given, the slayer is then guilty of manslaughter; but if the slayer hath not begun to fight, or (having begun) endeavours to decline any farther struggle, and afterwards, being closely pressed by his antagonist, kills him to avoid his own destruction, this is homicide excusable by self-defence. For which reason the law requires, that the person, who kills another in his own defence, should have retreated as far as he conveniently or safely can, to avoid the violence of the assault, before he turns upon his assailant; and that not seditiously, or in order to watch his opportunity, but from a real tenderness of shedding his brother's blood. And though it may be cowardice, in time of war between two independent nations, to flee from an enemy; yet between two fellow-subjects, the law countenances no such point of honour: because the king and his courts are the *vindices injuriarum*, and will give to the party wronged all the satisfaction he deserves. In this the civil law also agrees with ours, or perhaps goes rather farther; "*qui cum aliter tueri se non possunt, damni culpam dederint, innoxii sunt.*" The party assaulted must therefore flee as far as he conveniently can, either by reason of some wall, ditch, or other impediment; or as far as the fierceness of the assault will permit him: for it may be so fierce as not

to allow him to yield a step, without manifest danger of his life, or enormous bodily harm; and then in his defence he may kill his assailant instantly. And this is the doctrine of universal justice, as well as of the municipal law.

And, as the manner of the defence, so is also the time to be considered: for if the person assaulted does not fall upon the aggressor till the affray is over, or when he is running away, this is revenge and not defence. Neither, under the colour of self-defence, will the law permit a man to screen himself from the guilt of deliberate murder: for if two persons, A and B, agree to fight a duel, and A gives the first onset, and B retreats as far as he safely can, and then kills A, this is murder; because of the previous malice and concerted design. But if A upon a sudden quarrel assaults B first, and upon B's returning the assault, A really and *bona fide* flees; and, being driven to the wall, turns again upon B and kills him; this may be *se defendendo*, according to some of our writers: tho' others have thought this opinion too favourable; inasmuch as the necessity, to which he is at last reduced, originally arose from his own fault. Under this excuse of self-defence, the principal civil and natural relations are comprehended: therefore, master and servant, parent and child, husband and wife, killing an assailant in the necessary defence of each other respectively, are excused; the act of the relation assisting being construed the same as the act of the party himself.

There is one species of homicide *se defendendo*, where the party slain is equally innocent as he who occasions his death: and yet this homicide is also excusable from the great universal principle of self-preservation, which prompts every man to save his own life preferable to that of another, where one of them must inevitably perish. As, among others, in that case mentioned by lord Bacon, where two persons, being shipwrecked, and getting on the same plank, but finding it not able to save them both, one of them thrusts the other from it, whereby he is drowned. He who thus preserves his own life at the expence of another man's, is excusable through unavoidable necessity, and the principle of self-defence; since their both remaining on the same weak plank is a mutual, though innocent, attempt upon, and an endangering of, each other's life.

Let us next take a view of those circumstances wherein those two species of homicide, by misadventure and self-defence, agree; and those are in their blame and punishment. For the law sets so high a value upon the life of a man, that it always intends some misbehaviour in the person who takes it away, unless by the command or express permission of the law. In the case of misadventure, it presumes negligence, or at least a want of sufficient caution in him who was so unfortunate as to commit it; who therefore is not altogether faultless. And as to the necessity which excuses a man who kills another *se defendendo*, lord Bacon entitles it *necessitas culpabilis*, and thereby distinguishes it from the former necessity of killing a thief or a malefactor. For the law intends that the quarrel or assault arose from some unknown wrong, or some provocation, either in word or deed: and since in quarrels both parties may be, and usually are, in some fault; and it scarce can be tried who was originally in

the wrong; the law will not hold the survivor entirely guiltless. But it is clear, in the other case, that where I kill a thief who breaks into my house, the original default can never be upon my side. The law besides may have a farther view, to make the crime of homicide more odious, and to caution men how they venture to kill another upon their own private judgment; by ordaining, that he who slays his neighbour, without an express warrant from the law so to do, shall in no case be absolutely free from guilt.

Nor is the law of England singular in this respect. Even the slaughter of enemies required a solemn purgation among the Jews; which implies, that the death of a man, however it happens, will leave some stain behind it. And the Mosaiical law appointed certain cities of refuge for him "who killed his neighbour unawares; as if a man goeth into the wood with his neighbour to hew wood, and his hand fetcheth a stroke with the ax to cut down a tree, and the head slippeth from the helve, and lighteth upon his neighbour that he die, he shall flee unto one of those cities and live." But it seems he was not held wholly blameless, any more than in the English law; since the avenger of blood might slay him before he reached his asylum, or if he afterwards stirred out of it till the death of the high priest. In the imperial law likewise casual homicide was excused, by the indulgence of the emperor signed with his own sign manual, "*adnotatione principis*;" otherwise, the death of a man, however committed, was in some degree punishable. Among the Greeks, homicide by misfortune was expiated by voluntary banishment for a year. In Saxony, a fine is paid to the kindred of the slain; which also, among the western Goths, was little inferior to that of voluntary homicide: and in France, no person is ever absolved in cases of this nature, without a largess to the poor, and the charge of certain masses for the soul of the party killed.

The penalty inflicted by our laws is said by Sir Edward Coke to have been anciently no less than death; which, however, is with reason denied by latter and more accurate writers. It seems rather to have consisted in a forfeiture, some say of all the goods and chattels, others of only a part of them, by way of fine or *amercement*: which was probably disposed of, as in France, *in pios usus*, according to the humane superstition of the times, for the benefit of his soul who was thus suddenly sent to his account with all his imperfections on his head. But that reason having long ceased, and the penalty (especially if a total forfeiture) growing more severe than was intended, in proportion as personal property has become more considerable, the delinquent has now, and has had as early as our records will reach, a pardon and writ of restitution of his goods as a matter of course and right, only paying for suing out the same. And, indeed, to prevent this expence, in cases where the death has notoriously happened by misadventure or in self-defence, the judges will usually permit (if not direct) a general verdict of acquittal.

III. Felonious homicide is an act of a very different nature from the former, being the killing of a human creature, of any age or sex, without justification or excuse. This may be done either by killing one's self, or another man: for the consideration of which, see the

Homily
Homan.

articles SELF-MURDER, MURDER, and MANSLAUGHTER.

HOMILY, in ecclesiastical writers, a sermon, or discourse, upon some point of religion, delivered in a plain manner, so as to be easily understood by the common people.—The word is Greek, *ομιλία*; formed of *ομιλεω*, *catus*, "assembling, or council."

At the time of the reformation, there were several of these homilies made and printed, and ordered to be read in such churches as were not provided with a sufficiently learned minister, in order to prevent unsound doctrine being taught in remote country places.

In the primitive church, homily rather meant a conference or conversation by way of question and answer, which made part of the office of a bishop, till the 5th century, when the learned priests were allowed to preach, catechise, &c. in the same manner as the bishops used to do.

There are still extant several fine homilies, composed by the ancient fathers, particularly St Chrysostom and St Gregory.

DE HOMINE *Replegiando*. See *Falsè-IMPRISONMENT*.

The writ *de homine replegiando* lies to replevy a man out of prison, or out of the custody of any private person (in the same manner that chattels taken in any distress may be replevied), upon giving security to the sheriff, that the man shall be forthcoming to answer any charge against him. And if the person be conveyed out of the sheriff's jurisdiction, the sheriff may return that he is *eigoined, elongatus*; upon which a process issues (called *capias in withernam*), to imprison the defendant himself, without bail or mainprize, till he produces the party. But this writ is guarded with so many exceptions, that it is not an effectual remedy in numerous instances, especially where the crown is concerned. See *HABEAS CORPUS*.

HOMMOC, a name given by mariners to a hillock, or small eminence of land, resembling the figure of a cone, and appearing on the sea coast of any country.

HOMO, **MAN**, is ranked by Linnæus under the order of primates; and characterised by having four parallel foreteeth both in the upper and lower jaw, and two mammae on the breast. The species, according to this author, are two, viz. the *homo sapiens*, and the *homo troglodytes*.

He subdivides the *homo sapiens* into five varieties, viz. the American, the European, the Asiatic, the African, and what he calls the *manfrous*. See *MAN*.

The *troglodytes*, or orang outang, is a native of Ethiopia, Java, and Amboina. His body is white; he walks erect; and is about one half the ordinary human size. He generally lives about 25 years. He conceals himself in caves during the day, and searches for his prey in the night. He is said to be exceedingly sagacious, but is not endowed with the faculty of speech. See *TROGLODYTES*, *ORANG OUTANG*, and *SIMIA*.

HOMOLOGOUS, in geometry, an appellation given to the corresponding sides and angles of similar figures, as being proportional to each other.

HONAN, a province of China, bounded on the north by that of Pecheli and Chanfi, on the west by Chanfi, on the south by Houquang, and on the east

by Chantong. It is watered by the river Holiango; and besides the forts, castles, and garrisoned towns, it contains eight cities of the first rank, and 102 of the second and third. The air of this province is very temperate and healthful, abounding with wheat, rice, pastures, cattle, oranges of several sorts, pomegranates, and all sorts of European fruits. Towards the west it is mountainous and woody, and towards the east it is all cultivated like a garden. It is well watered with fountains, brooks, and rivers, which render it very pleasant.

HONDERKOOTER (Melchior), a famous Dutch painter born at Utrecht, excelled in painting animals, and especially birds. His pictures sell at a high price, and are much sought after. He died at Utrecht in 1695, aged 59.

HONDURAS, a province of North America in New Spain, lying on the North Sea, being about 370 miles in length, and 200 in breadth; it was discovered by Christopher Columbus in the year 1502. The English have been possessed of the logwood country on the bay of Honduras a great while, and cut large quantities every year. The Mosquito native Americans live in the eastern parts; and being independent of the Spaniards, have entered into treaties with the English, and serve them in several capacities. This province is watered by several rivers, which enrich the country by their inundations; and it is very fertile in Indian corn. It is said there are some mines of gold and silver in this province. Valadolid is the capital town.

HONE, a fine kind of white stone, used for setting razors, pen-knives, and the like.

HONEY, a sweet vegetable juice, collected by the bees from the flowers of various plants, and deposited in the cells of the comb; from which it is extracted either by spontaneous percolation through a sieve in a warm place, the comb being separated and laid thereon, or by expression. That which runs spontaneously is purer than that which is expressed, a quantity of the wax and other matters being forced out along with it by the pressure. The best sort of honey is of a thick consistence, a whitish colour inclining to yellow, an agreeable smell, and pleasant taste; both the colour and flavour are said to differ in some degree, according to the plants which the bees collect it from. It is supposed that honey is merely the juice of the flower perspiring, and becoming inspissated thereon; and that the bee takes it up with its proboscis, and carries it to be deposited in its waxen cells, with which the young bees are to be fed in summer, and the old ones in winter: but it is certain, that honey can be procured by no other method of collecting this juice than by the bees. The honey wrought by the young bees, and that which is permitted to run from the comb without heat or pressure, is white and pure, and called *virgin's honey*. The honey of old bees, and that which is forced from the comb by heat or pressure, is yellow, from the wax. Honey produced where the air is clear and hot, is better than that where the air is variable and cold.—The honey of Narbonne in France, where rosemary abounds, is said to have a very manifest flavour of that plant, and to be imitable by adding to other honey an infusion of rosemary flowers.—Honey, considered as a medicine, is a very useful detergent and aperient, powerfully dissolving

Honder-
kooter
Honey.

vificid

Honey-dew.

vifcid juices, and promoting the expectoration of tough phlegm: in fome particular confutations it has an inconvenience of griping, or of proving purgative; this is faid to be in fome meafure prevented by previously boiling the honey.

HONEY-Dew, a fweet faccharine fubftance founded on the leaves of certain trees, of which bees are very fond, by the husbandmen fuppofed to fall from the heavens like common dew. This opinion hath been refuted, and the true origin of this and other faccharine dews fhewn by the Abbe Boiffier de Sauvages, in a memoir read before the Society of Sciences at Montpellier, "Chance (fays the Abbe) afforded me an opportunity of feeling this juice in its primitive form on the leaves of the holm-oak: thefe leaves were covered with thoufands of fmall round globules, or drops, which, without touching one another, feemed to point out the pore from whence each of them had proceeded. My tafte informed me that they were as fweet as honey: the honey-dew on a neighbouring bramble did not refemble the former, the drops having run together; owing either to the moiſture of the air which had diluted them, or to the heat which had expanded them. The dew became more viſcous, and lay in large drops, covering the leaves; in this form it is uſually ſeen.

"The oak had at this time two forts of leaves; the old, which were ſtrong and firm; and the new, which were tender, and newly come forth. The honey-dew was found only on the old leaves; tho' theſe were covered by the new ones, and by that means ſheltered from any moiſture that could fall from above. I obſerved the fame on the old leaves of the bramble, while the new leaves were quite free from it. Another proof that this dew proceeds from the leaves is, that other neighbouring trees not furniſhed with a juice of this kind, had no moiſture on them; and particularly the mulberry, which is a very particular circumſtance, for this juice is a deadly poiſon to ſilk-worms. If this juice fell in the form of a dew, miſt, or fog, it would wet all the leaves without diſtinction, and every part of the leaves, under as well as upper. Heat may have ſome ſhare in its production: for though the common heat promotes only the tranſpiration of the more volatile and fluid juices, a ſultry heat, eſpecially if reflected by clouds, may ſo far dilate the veſſel, as to produce a more viſcous juice, ſuch as the honey-dew.

"The ſecond kind of honey-dew, which is the chief reſource of bees after the ſpring-flowers and dew by tranſpiration on leaves are paſt, owes its origin to a ſmall infect called a *vine-fretter*; the excrement ejected with ſome force by this infect makes a part of the moſt delicate honey known in nature. See **APHIS**.

"Theſe vine-fretters reſt during ſeveral months on the barks of particular trees, and extract their food by piercing that bark, without hurting or deforming the tree. Theſe infects alſo cauſe the leaves of ſome trees to curl up, and produce galls upon others. They ſettle on branches that are a year old. The juice, at firſt perhaps hard and crabbed, becomes, in the bowels of this infect, equal in ſweetneſs to the honey obtained from the flowers and leaves of vegetables; excepting that the flowers may communicate ſome of their eſſential oil to the honey, and this may give it a peculiar flavour, as happened to myſelf by planting a

hedge of roſemary near my bees at Sauvages: the honey has taſted of it ever ſince, that ſhrub continuing long in flower.

"I have obſerved two ſpecies of vine-fretters, which live unſheltered on the bark of young branches; a larger and a leſſer.

"The leſſer ſpecies is of the colour of the bark upon which it feeds, generally green. It is chiefly diſtinguiſhed by two horns, or ſtrait, immovable, fleſhy ſubſtances, which riſe perpendicularly from the lower ſides of the belly, one on each ſide. This is the ſpecies which live on the young branches of bramble and elder.

"The larger ſpecies is double the ſize of the other; is of a blackiſh colour; and inſtead of the horns which diſtinguiſh the other, have in the ſame part of the ſkin a ſmall button, black and ſhining like jet.

"The buzzing of bees in a tuft of holm-oak, made me ſuſpect that ſomething very intereſting brought fo many of them thither. I knew that it was not the ſeaſon for expecting honey-dew, nor was it the place where it is uſually found; and was ſurprized to find the tuft of leaves and branches covered with drops which the bees collected with a humming noiſe. The form of the drops drew my attention, and led me to the following diſcovery. Inſtead of being round like drops which had fallen, each formed a ſmall longiſh oval. I ſoon perceived from whence they proceeded. The leaves covered with theſe drops of honey were ſituated beneath a ſwarm of the larger black vine-fretters; and on obſerving theſe infects, I perceived them from time to time raiſe their bellies, at the extremity of which there then appeared a ſmall drop of an amber colour, which they inſtantly ejected from them to the diſtance of ſome inches. I found by taſting ſome of theſe drops which I had caught on my hand, that it had the ſame flavour with what had before fallen on the leaves. I afterwards ſaw the ſmaller ſpecies of vine-fretters eject their drops in the ſame manner.

"This ejection is ſo far from being a matter of indifference to theſe infects themſelves, that it ſeems to have been wiſely inſtituted to procure cleanlineſs in each individual, as well as to preſerve the whole ſwarm from deſtruction; for preſſing as they do one upon another, they would otherwiſe ſoon be glued together, and rendered incapable of ſtirring.

"The drops thus ſpurred out fall upon the ground, if not intercepted by leaves or branches; and the ſpots they make on ſtones remain ſome time, unleſs waſhed off by rain. This is the only honey-dew that falls; and this never falls from a greater height than a branch where theſe infects can cluſter.

"It is now eaſy to account for a phenomenon which formerly puzzled me greatly. Walking under a lime-tree in the king's garden at Paris, I felt my hand wetted with little drops, which I at firſt took for ſmall rain. The tree indeed ſhould have ſheltered me from the rain, but I eſcaped it by going from under the tree. A ſeat placed near the tree ſhone with theſe drops. And being then unacquainted with any thing of this kind, except the honey-dew found on the leaves of ſome particular trees, I was at a loſs to conceive how ſo glutinous a ſubſtance could fall from the

leaves

Honey-dew.

Honey-
dew
Honour.

leaves in such small drops: for I knew that rain could not overcome its natural attraction to the leaves till it became pretty large drops; but I have since found, that the lime-tree is very subject to these vine-fretters.

"Bees are not the only insects that feast upon this honey; ants are equally fond of it. Led into this opinion by what naturalists have said, I at first believed that the horns in the lesser species of these vine-fretters had in their extremity a liquor which the ants went in search of: but I soon discovered that what drew the ants after them came from elsewhere, both in the larger and lesser species, and that no liquor is discharged by the horns.

"There are two species of ants which search for these insects. The large black ants follow those which live on the oaks and chestnut; the lesser ants attend those on the elder. But as the ants are not, like the bees, provided with the means of sucking up fluids; they place themselves near the vine-fretters, in order to seize the drop the moment they see it appear upon the anus; and, as the drop remains some time on the small vine fitters before they can cast it off, the ants have leisure to catch it, and thereby prevent the bees from having any share: but the vine-fretters of the oak and chestnut being stronger, and perhaps more plentifully supplied with juice, dart the drop instantly, so that the larger ants get very little of it.

"The vine-fretters finding the greatest plenty of juice in trees about the middle of summer, afford also at that time the greatest quantity of honey; and this lessens as the season advances, so that in the autumn the bees prefer it to the flowers then in season.

"Though these insects pierce the tree to the sap in a thousand places, yet the trees do not seem to suffer at all from them, nor do the leaves lose the least of their verdure. The husbandman therefore acts injudiciously when he destroys them."

HONEY-GUIDE, a curious species of cuckoo. See **CUCULUS**.

HONEY-SUCKLE. See **LONICERA**.

HONFLEUR, a considerable sea-port town of France, in Upper Normandy, with a good harbour, and trade in bone-lace. It is seated on the river Seine, in E. Long. o. 8. N. Lat. 17. 49.

HONITON, a town of Devonshire in England, seated near the river Otter, over which there is a bridge on the road from London to Exeter. A dreadful fire happened here in July 1747, which consumed three parts of the town, and the damage was computed at 43,000*l*. It sends two members to parliament; but being no corporation, a portrieve is the returning officer. It has one church, which is half a mile from the town, and a chapel within it; with about 400 houses, which are chiefly in one broad-paved street. Here is a large manufactory of bone-lace. W. Long. 3. 11. N. Lat. 50. 43.

HONOUR, a testimony of esteem or submission, expressed by words, actions, and an exterior behaviour, by which we make known the veneration and respect we entertain for any one on account of his dignity or merit. The word *honour* is also used in general for the esteem due to virtue, glory, and reputa-

tion. It is also used for *virtue* and *probity* themselves, and for an exactness in performing whatever we have promised; and in this last sense we use the term, *a man of honour*. But *honour* is more particularly applied to two different kinds of virtue; bravery in men, and chastity in women.—Virtue and Honour were deified among the ancient Greeks and Romans, and had a joint temple consecrated to them at Rome: but afterwards each of them had separate temples, which were so placed, that no one could enter the temple of Honour, without passing through that of Virtue; by which the Romans were continually put in mind, that virtue is the only direct path to true glory. Plutarch tells us, that the Romans, contrary to their usual custom, sacrificed to Honour uncovered; perhaps to denote, that wherever honour is, it wants no covering, but shews itself openly to the world.

HONOUR, or Rank.—The degrees of honour which are observed in Britain, may be comprehended under these two heads, viz. *nobiles majores*, and *nobiles minores*. Those included under the first rank are, archbishops, dukes, marquises, earls, viscounts, bishops, and barons; which are all distinguished by the respective ornaments of their escutcheons: and those of the last are baronets, knights, esquires, and gentlemen. There are some authors who will have baronets to be the last under the first rank; and their reason is, because their honour is hereditary, and by patent, as that of the nobility. See **COMMONALTY** and **NOBILITY**.

HONOURS of War, in a siege, is, when a governor, having made a long and vigorous defence, is at last obliged to surrender the place to the enemy, for want of men and provisions, and makes it one of his principal articles to march out with the *honours of war*; that is, with shouldered arms, drums beating, colours flying, and all their baggage, &c.

Military HONOURS. All armies salute crowned heads in the most respectful manner, drums beating a march, colours and standards dropping, and officers saluting. Their guards pay no compliment, except to the princes of the blood; and even that by courtesy, in the absence of the crowned head.

To the commander in chief the whole line turns out without arms, and the camp-guards beat a march, and salute.

To generals of horse and foot, they beat a march, and salute.

Lieutenant-generals of ditto, three ruffs, and salute.

Major-generals of ditto, two ruffs, and salute.

Brigadiers of ditto, rested arms, one ruff, and salute.

Colonels of ditto, rested arms, and no beating. Centinels rest their arms to all field-officers, and shoulder to every officer.

All governors, that are not general-officers, shall, in all places where they are governors, have one ruff, with rested arms; but for those who have no commission as governors, no drum shall beat.

Lieutenant-governors shall have the main-guard turned out to them with shouldered arms.

Prussian Honours of War, chiefly imitated by most powers in Europe, are,

To the king, all guards beat the march, and all officers salute.

Field-

Honour,
Honours.

Honour.

Field-marshal received with the march, and saluted in the king's absence.

General of horse or foot, four ruffs; but if he commands in chief, a march and salute.

Mil. Dis.

Lieutenant-generals of horse or foot, commanding or not, guards beat three ruffs.

Major-generals of horse or foot, two ruffs.

Officers, when their guards are under arms, and a general makes a signal, must reit to him, but not beat; when not got under arms, and a signal made, only stand by their arms.

Village-guards go under arms only to the king, field-marshal, general of horse and foot, and to the general of the day.

Generals guards go under arms only to the king, field-marshal, and the general over whom they mount.

Commanding officers of regiments and battalions, their own quarter and rear guards to turn out; but not to other field-officers, unless they are of the day.

Generals in foreign service, the same.

HONOURS paid by Centinels. Field-marshal; two centinels with ordered firelocks, at their tent or quarters.

Generals of horse or foot; two centinels, one with his firelock shouldered, the other ordered.

Lieutenant-generals; one, with firelock ordered.

Major-generals; one, with firelock shouldered.

The first battalion of guards go under arms to the king only; not to stand by, nor draw up in the rear of their arms to any other; nor to give centinels to foreigners. Second and third battalions draw up behind their arms to the princes, and to field-marshal; but when on grenadier-guards or out-posts, they turn out, as other guards do, to the officers of the day. They give one centinel with shouldered arms to the princes of the blood, and to field-marshal when they lie alone in garrison.

Court of Honour. See Court of CHIVALRY.

Fountain of Honour. The king is so styled, as being the source of honours, dignities, &c. See PREROGATIVE.

It is impossible that government can be maintained without a due subordination of rank; that the people may know and distinguish such as are set over them, in order to yield them their due respect and obedience; and also that the officers themselves, being encouraged by emulation and the hopes of superiority, may the better discharge their functions: and the law supposes, that no one can be so good a judge of their several merits and services, as the king himself who employs them. It has therefore intrusted him with the sole power of conferring dignities and honours, in confidence that he will bestow them upon none but such as deserve them. And therefore all degrees of nobility, of knighthood, and other titles, are received by immediate grant from the crown: either expressed in writing, by writs or letters patent, as in the creations of peers and baronets; or by corporeal investiture, as in the creation of a simple knight.

From the same principle also arises the prerogative of erecting and disposing of offices: for honours and offices are in their nature convertible and synonymous. All offices under the crown carry in the eye of the law an honour along with them; because they imply

Vol. V.

a superiority of parts and abilities, being supposed to be always filled with those that are most able to execute them. And, on the other hand, all honours in their original had duties or offices annexed to them: an earl, *comes*, was the conservator or governor of a county; and a knight, *miles*, was bound to attend the king in his wars. For the same reason therefore that honours are in the disposal of the king, offices ought to be so likewise; and as the king may create new titles, so may he create new offices: but with this restriction, that he cannot create new offices with new fees annexed to them, nor annex new fees to old offices; for this would be a tax upon the subject, which cannot be imposed but by act of parliament. Wherefore, in 13 Hen. IV. a new office being created by the king's letters patent for measuring cloths, with a new fee for the same, the letters patent were, on account of the new fee, revoked and declared void in parliament.

Upon the same, or a like reason, the king has also the prerogative of conferring privileges upon private persons. Such as granting place or precedence to any of his subjects, as shall seem good to his royal wisdom: or such as converting aliens, or persons born out of the king's dominions, into denizens; whereby some very considerable privileges of natural-born subjects are conferred upon them. Such also is the prerogative of erecting corporations; whereby a number of private persons are united and knit together, and enjoy many liberties, powers, and immunities in their politic capacity, which they were utterly incapable of in their natural.

Maid of Honour, are six young ladies in the household of the queen and princess-royal; the salary of those of a queen are 300l. per ann. each, and those of a princess dowager of Wales, 200l.

Honour-Point, in heraldry, is that next above the centre of the escutcheon, dividing the upper part into two equal portions.

HONOURABLE, a title conferred on the younger sons of earls, the sons of viscounts and barons; as also on such persons as have the king's commission, and upon those who enjoy places of trust and honour.

HONOURARY, something done or conferred upon any one, to do him honour. See the article Honour.

Honourary is sometimes understood of a person who bears or possesses some post or title, only for the name's sake, without doing any thing of the functions belonging to it, or receiving any advantage from it: thus we say, honourary counsellors, honourary fellows, &c.

Honourary is also used for a lawyer's fee, or a salary given to public professors in any art or science.

HOOD (Robin), a famous outlaw and deer-stealer, who chiefly harboured in Sherwood forest in Nottinghamshire. He was a man of family, which by his pedigree appears to have had some title to the earldom of Huntingdon; and played his pranks about the latter end of the 12th century. He was famous for archery, and for his treatment of all travellers who came in his way; levying contributions on the rich, and relieving the poor. Falling sick at last, and requiring to be bled, he is said to have been betrayed and bled to death. He died in 1247; and was buried

21 E

ried

Honour

Hood.

Hood
||
Hooke.

ried at Kirklees in Yorkshire, then a Benedictine monastery, where his gravestone is still shewn.

HOON-Island, one of the *MARQUESAS Islands* in the South Sea. It was discovered in April 1774 by captain Cook, who gave it that name from the person who first saw the land. It is the most northerly of the cluster, and lies in S. Lat. 9. 26. W. Long. 139. 13.

HOOF, the horny substance that covers the feet of divers animals, as oxen, horses, &c.

HOOR-bound, in Fariery. See there, § xlii.

HOOF (Peter Cornelius Van), an eminent historian and poet, born at Amsterdam in 1581. He was lord of Muyden, judge of Goyland, and knight of the order of St Michael. He died at the Hague in 1647. He wrote, 1. An excellent history of the Netherlands, from the abdication of Charles V. to the year 1588. 2. Several Comedies, and other works. By these he acquired such reputation, that the Flemings considered him as the Homer and Tacitus of the Netherlands.

HOOGUESTRATEN, a town of the Netherlands in Dutch Brabant, and capital of a county of the same name. E. Long. 4. 41. N. Lat. 51. 25.

HOOSKE (Robert), a very eminent English mathematician and philosopher, was the son of Mr John Hooke minister of Freshwater in the Isle of Wight, where he was born in 1635. He very early discovered a genius for mechanics, by making curious toys with great art and dexterity. He was educated under Dr Busby in Westminster school; where he not only acquired a competent share of Greek and Latin, together with an insight into Hebrew and some other Oriental languages, but also made himself master of a good part of Euclid's elements. About the year 1653 he went to Christ-church in Oxford, and in 1655 was introduced to the Philosophical Society there; where, discovering his mechanic genius, he was first employed to assist Dr Willis in his operations in chemistry, and afterwards recommended to the honourable Robert Boyle, Esq; whom he served several years in the same capacity. He was also instructed in astronomy about this time by Dr Seth Ward, Savilian professor of that science; and from henceforward distinguished himself by many noble inventions and improvements of the mechanic kind. He invented several astronomical instruments, for making observations both at sea and land; and was particularly serviceable to Mr Boyle in completing the invention of the air-pump. Sir John Cutler having founded a mechanic school in 1664, he settled an annual stipend on Mr Hooke for life, intrusting the president, council, and fellows, of the Royal Society to direct him with respect to the number and subject of his lectures; and on the 11th of January 1664-5, he was elected by that society, curator of experiments for life, with an additional salary. In 1666 he produced to the Royal Society a model for rebuilding the city of London destroyed by fire, with which the society was well pleased; and the lord mayor and aldermen preferred it to that of the city surveyor, though it happened not to be carried into execution. It is said, by one part of this model of Mr Hooke's, it was designed to have all the chief streets, as from Leaden-hall to Newgate, and the like, to lie in exact straight lines, and all the

Hooke.

other cross-streets turning out of them at right angles, with all the churches, public buildings, markets, &c. in proper and convenient places. The rebuilding of the city according to the act of parliament requiring an able person to set out the ground to the proprietors, Mr Hooke was appointed one of the surveyors; in which employment he got most of part of his estate, as appeared pretty evident from a large iron chest of money found after his death, locked down with a key in it, and a date of the time, which shewed it to have been so shut up above 30 years.—Mr Oldenburg, secretary to the Royal Society, dying in 1677, Mr Hooke was appointed to supply his place, and began to take minutes at the meeting in October, but did not publish the Transactions. In the beginning of the year 1687, his brother's daughter, Mrs Grace Hooke, who had lived with him several years, died; and he was so affected with grief at her death, that he hardly ever recovered it, but was observed from that time to become less active, more melancholy, and, if that could be, more cynical than ever. At the same time, a chancery suit in which he was concerned with Sir John Cutler, on account of his salary for reading the Cutlerian lectures, made him very uneasy, and increased his disorder. In 1691, he was employed in forming the plan of the hospital near Hoxton, founded by Robert Aik alderman of London, who appointed archbishop Tillotson one of his executors; and in December the same year, Hooke was created doctor of Physic, by a warrant from that prelate. In July 1696, the chancery suit with Sir John Cutler was determined in his favour, to his inexplicable satisfaction. His joy on that occasion was found in his diary thus expressed; *DOMINUS EST: that is, Deo, Optimo, Maximo, sit honor, laus, gloria, in secula seculorum, Amen.* "I was born on this day of July 1635, and God has given me a new birth: may I never forget his mercies to me! while he gives me breath may I praise him!"—In the same year 1696, an order was granted to him for repeating most of his experiments at the expence of the Royal Society, upon a promise of his finishing the accounts, observations, and deductions from them, and of perfecting the description of all the instruments contrived by him; but his increasing illness, and general decay, rendered him unable to perform it. He continued some years in this wretched condition; and thus languishing till he was quite emaciated, he died March 3d, 1702, at his lodgings in Gresham college, and was buried in St Helen's church, Bishopgate street; his corpse being attended by all the members of the Royal Society then in London.

As to the character of Mr Hooke, it is not in all respects one of the most amiable. He made but a despicable figure as to his person, being short of stature, very crooked, pale, lean, and of a meagre aspect, with dark brown hair, very long, and hanging over his face uncut and lank. Suitable to his person, his temper was penurious, melancholy, mistrustful; and, though possessed of great philosophical knowledge, he had so much ambition, that he would be thought the only man who could invent or discover; and thus frequently laid claim to the inventions and discoveries of others, while he boasted of many of his own which he never communicated. In the religious part of his character

Hooker.

character he was so far exemplary, that he always expressed a great veneration for the Deity; and seldom received any remarkable benefit in life, or made any considerable discovery in nature, or invented any useful contrivance, or found out any difficult problem, without setting down his acknowledgment to God, as many places in his diary plainly shew. He frequently studied the sacred writings in the original; for he was acquainted with the ancient languages, as well as with all parts of the mathematics.—He wrote, 1. *Lectioes Cutlerianæ*. 2. *Micrographia*, or Descriptions of minute bodies made by magnifying glasses. 3. A description of helioscopes. 4. A description of some mechanical improvements of lamps and water-works, quarto. 5. Philosophical collections. After his death were published, 6. Poetical works collected from his papers by Richard Waller secretary to the Royal Society.

HOOKER (John), *alias* VOWELL, was born in Exeter, about the year 1524, the second son of Robert Hooker, who in 1529 was mayor of that city. He was instructed in grammar learning by Dr Moreman, vicar of Menhinit in Cornwall, and thence removed to Oxford; but to what college is uncertain. Having left the university, he travelled to Germany, and resided some time at Cologne, where he kept exercises in law, and probably graduated. Thence he went to Strasburg, where he studied divinity under the famous Peter Martyr. He now returned to England, and soon after visited France, intending to proceed to Spain and Italy; but was prevented by a declaration of war. Returning therefore again to England, he fixed his residence in his native city, where, having married, he was in 1554 elected chamberlain, being the first person who held that office, and in 1571 represented his fellow-citizens in parliament. He died in the year 1601, and was buried in the cathedral church at Exeter. He wrote, among other works, 1. Order and usage of keeping of parliaments in Ireland. 2. The events of comets or blazing stars, made upon the sight of the comet Pagonia, which appeared in November and December 1577. 3. An addition to the chronicles of Ireland from 1546 to 1568; in the second volume of Holinshed's chronicle. 4. A description of the city of Exeter, and of the sondrie assaults given to the same; in Holinshed's chron. vol. iii. 5. A book of ensignes. 6. Translation of the history of the conquest of Ireland from the Latin of Giraldus Cambrensis; in Holinshed's chron. vol. ii. 7. *Synopsis chorographica*, or an historical record of the province of Devon; never printed.

HOOKER (Richard), a learned divine, was born at Heavy-tree, near Exeter, in the year 1553. Some of his ancestors were mayors of that city, and he was nephew to John HOOKER the historian. By this uncle he was first supported at the university of Oxford, with the addition of a small pension from Dr Jewel, bishop of Salisbury, who in 1561 got him admitted one of the clerks of Corpus Christi college. In 1573 he was elected scholar. In 1577 he took the degree of master of arts, and was admitted fellow the same year. In July 1579, he was appointed deputy professor of the Hebrew language. In October, in the same year, he was for some trivial misdemeanour expelled the college, but was immediately restored.

Hooker
Hooper.

In 1581 he took orders; and, being appointed to preach at St Paul's cross, he came to London, where he was unfortunately drawn into a marriage with Joan Churchman, the termagant daughter of his hostess. Having thus lost his fellowship, he continued in the utmost distress till the year 1584, when he was presented by John Cheney, Esq. to the rectory of Drayton-Baucham in Buckinghamshire. In this retirement he was visited by Mr Edwin Sandys, and Mr George Crammer, his former pupils. They found him, with a Horace in his hand, tending some sheep in the common field, his servant having been ordered home by his sweet Xantippe. They attended him to his house; but were soon deprived of his company by an order, from his wife Joan, for him to come and rock the cradle. Mr Sandys's representation to his father, of his tutor's situation, procured him the mastership of the Temple. In this situation he met with considerable molestation from one Travers, lecturer of the Temple, and a bigoted Puritan, who in the afternoon endeavoured to confute the doctrine delivered in the morning. From this disagreeable situation he solicited archbishop Whitgift to remove him to some country retirement, where he might prosecute his studies in tranquillity. Accordingly, in 1591, he obtained the rectory of Boscomb in Wiltshire, together with a prebend in the church of Salisbury, of which he was also made sub-dean. In 1594 he was presented to the rectory of Bishopbourne in Kent, where he died in the year 1600. He was buried in his own parish-church, where a monument was erected to his memory by William Cooper, Esq. He was a meek, pious, and learned divine. He wrote, 1. Ecclesiastical politie, in eight books. fol. 2. A discourse of justification, &c. with two other sermons, Oxf. 1612, 4to. Also several other sermons printed with the Ecclesiastical Politie.

HOOKER, in naval architecture, a vessel much used by the Dutch, built like a pink, but rigged and masted like a hoy.

Hookers will lie nearer a wind than vessels with cross-fails can do. They are from 50 to 200 tons burthen, and with a few hands will sail to the East Indies.

HOOP, a piece of pliant wood, or iron, bent into a circular form, commonly used for securing calks, &c. *Driving a Hoop*, a boyish exercise, of good effect in rendering the limbs pliable, and for strengthening the nerves.

HOOPER (John), bishop of Worcester, and a martyr in the Protestant cause, was born in Somersetshire, and educated at Oxford, probably in Merton-college. In 1518 he took the degree of bachelor of arts, and afterwards became a Cistercian monk; but at length, disliking his fraternity, he returned to Oxford, and there became infected with Lutheranism. In 1539 he was made chaplain and house-steward to Sir John Arundel, who afterwards suffered with the protector in the reign of Edward VI. But *that very catholic knight*, as Wood calls him, discovering his chaplain to be a heretic, Hooper was obliged to leave the kingdom. After continuing some time in France, he returned to England, and lived with a gentleman called *Seintlow*; but, being again discovered, he escaped in the habit of a sailor to Ireland; thence

Hooper embarked for the continent, and fixed his abode in Switzerland.

When king Edward came to the crown, Mr Hooper returned once more to his native country. In 1550, by his old patron Sir John Arundel's interest with the earl of Warwick, he was consecrated bishop of Gloucester; and in 1552 was nominated to the see of Worcester, which he held in commendam with the former. But queen Mary had scarce ascended the throne, before his lordship was imprisoned, tried, and, not choosing to recant, condemned to the flames. He suffered this terrible death at Gloucester, on the 9th of February 1554, being then near 60 years of age. He was an avowed enemy to the church of Rome, and not perfectly reconciled to what he thought remnants of Popery in the church of England. In the former reign he had been one of Bonner's accusers, which sufficiently accounts for his being one of queen Mary's first sacrifices to the *holy see*. He was a person of good parts and learning, as may be found in Fox's *Book of Martyrs*.

HOOPER (George), a very learned writer, bishop of Bath and Wells, was well skilled in mathematics, and in the eastern learning and languages. He sat in those fees above 24 years, often refused a seat in the privy council, and could not be prevailed upon to accept of the bishopric of London on the death of bishop Compton. He wrote, 1. The church of England free from the imputation of Popery. 2. A discourse concerning Lent. 3. New danger of Presbytery. 4. An inquiry into the state of the ancient measures. 5. *De Valentinianorum heresi conjectura*. 6. Several sermons; and other works.

HOOPING-COUGH. See (the Index subjoined to) MEDICINE.

HOOPOE. See UPUPA.

HOORNBECK (John), professor of divinity in the universities of Leyden and Utrecht, was born at Haerlem in 1617. He understood the Latin, Hebrew, Chaldaic, Syriac, Rabbinical, Dutch, German, English, French, and Italian languages; and published many works, among which are, 1. A refutation of Socinianism, in 3 vols 4to. 2. A treatise for the conviction of the Jews. 3. Of the conversion of the Heathens. 4. Theological institutions, &c. which are written in Latin. Mr Bayle represents him as a complete model of a good pastor and divinity professor.

HOP, in botany. See HUMULUS.

New land is found to succeed better with hops than old; and on this principle they are very cautious in their plantations in Kent, and look forward for the after-produce. When they make a new hop-ground, they plant it with apple-trees at a large distance asunder, and with cherry-trees between: by this means, when the hops have grown ten years, which they judge as much as they will do well, they place their account in the cherry-trees, which bear large crops: these they gather for about 30 years, and then they cut them up, and depend upon their apple-trees only; which they find very large and strong by that time.

The dry stalks of hops should be burnt on the ground in winter, covering them with a little fresh earth as they burn. This makes together an excellent compost, to make the hills of. The land must be dug or plow-

ed well, and laid very even; and then the places for the hills marked out by a line, and a stick put in every place where one is to be. A thousand hills may be made in an acre of ground, and six or seven plants set on every hill. From six to nine feet should be allowed between every hill, and the grounds in the hills should be better and richer than the common earth. Some plant hops in March and April, but the most experienced people prefer the month of October, because they will then strike firm roots, and be strong and vigorous against spring. The largest plants are to be chosen; and it is best to procure them from some rich ground, where the hills have been laid high; they should be about eight or ten inches long, and have three or four joints or buds a-piece; the holes for planting them are to be dug eight or ten inches deep, and about a foot over; and in each of these holes four plants are to be set, one in each corner: they may be covered an inch deep over the top, if planted in October; but in spring, when they have shot from the joints, then they must not be buried: after this, the ground must be carefully kept clear of weeds.

Dressing of Hops. This is preparing the ground in winter and spring for the making a good summer-crop. In doing this, the hills upon which the plants stand must be all pulled down, and undermined on every side, till the spade comes near the principal root; then shake off or remove with the hand the loose mould from the upper or loose roots, that you may see where the new roots grow out of the old sets. The old sets are to be carefully preserved, but the other roots may be cut away. Whatever time the hills are pulled down, the roots must not be cut till March. When the young hops are dressed for the first time, all the roots are to be cut away that grew the year before, and the sets are to be cut off within one inch of the same; and every year after, they must be cut as close as may be to the old roots; but to a weak hop, some of the shoots are to be left at the dressing. Those roots of the plant which grow downwards, are never to be injured, but only those which run horizontally are to be cut. The old roots and the young ones may be easily distinguished, in that the old ones are always red, and the young white. If there are by accident any wild hops got among the rest, the places where they grow are to be marked with sticks, or otherwise, at the time of their being gathered; and after this, at the time of dressing the ground, that whole hill is to be destroyed, and a new one made with new plants in the room of it. When the roots are cut and dressed, the rich compost is to be put to them; and the hills must not be made too high at first, lest they hinder the young shoots.

Gathering and drying of Hops. Hops blow in the latter end of July; in the beginning of August they bell; and they are sometimes ripe at the beginning of September, sometimes later. When they begin to change colour, are easily pulled to pieces, and their seeds look brown within them, they are ripe; and they are then to be gathered as quick as possible, for the least blast of wind will hurt them at this time.

The manner of gathering hops, is to take down four hills standing together in the midst of the garden, and to cut the roots even with the ground, then lay the ground level; and when it is swept clean, it makes

Hop.

a floor, on which the hops may be laid and picked. The hop-plants are first unwound from the poles, and then the people sit round and pick off the hops into baskets.

Care should be taken to dry the hops as fast as they are picked, for in lying undried they are apt to heat and change colour very quickly. If the quantity picked be so large, that the kiln in which they are to be dried is over-stocked, they must be spread thin upon a floor, and they will keep two or three days in that manner without any harm. Indeed, where the quantity is but small, there is no need to have recourse to the kiln at all; for they will dry much better than any other way, by being laid thin upon a floor, and often turned. The drying of hops is the most material part of their manufacture: for if they be ill dried, they lose all their agreeable flavour; and great caution should be used, that they be all equally dried.

Bagging of Hops, a term used by the farmers, who cultivate hops, for the last thing they have to do with them in order to bring them to market; that is, the putting them up in large bags of coarse cloth, for carriage. When the hops have been picked and dried in the ool, or tin-floor, they are so brittle that they would break to pieces and be spoiled if they were immediately to be put up; they are therefore to lie together three weeks, or thereabouts, that they may become tough: if they are covered from the air by blankets in the heap, they may be bagged much sooner than if left open.

The manner of bagging them is this. A hole is made in an upper-floor, so large that a man may easily go up and down it; then a bag is fitted to the mouth of the bag, and so firmly sewed on, that it cannot be torn off; the bag is then let down through the hole, and the hoop remaining above, stops it from being pulled quite through, being larger than the hole: a few hops are to be first thrown into the bag, and a person below is to take up a parcel of these in each corner of the bag, tying it with a packthread; this makes a sort of tassels, by which the bags are afterwards the easier managed and turned about. When this is done, one man must go down into the bag, and, while another calls in the hops, he must tread them down equally every way with his feet; when the bag is in this manner filled, it is to be ripped from the hoop, and sewed up, leaving two tassels at the corners, as at the bottom. A bag of hops thus prepared, may be kept for several years in a dry place.

Uses, &c. The tops of this plant, being of a cooling quality, are eaten, when boiled, as an emollient. A decoction of hop-flowers is also accounted an antidote against poison; cures the itch, as well as the syph thereof; and is esteemed excellent in choleric and pestilential fevers. The heads and tendrils are good in the scurvy and most cutaneous diseases. Juleps and apozems are also prepared with hops for hypochondriacal and hysterical affections, and to promote the menses: but the chief use of this plant consists in preserving beer and other malt-liquors (in which the flower of this plant is a principal ingredient) from turning sour, and rendering it wholesome and grateful to the taste, &c.

Hops were introduced about 250 years ago, from Flanders, and from that time have been assiduously

cultivated in this kingdom. The duties arising from them are reckoned about 55,000*l. per annum*, for which reason all public brewers are enjoined under a severe penalty to use no other bitter than hops.

The benefits derived from hops are subject to great uncertainty, no plant being more exposed to accidents; and, independent of this, too great fertility is to the industrious owner sometimes as fatal as too slender a crop. But those who have money, and of course are able to wait for a market, avail themselves of both. The great hop-planter, if a man of skill and substance, seldom fails of making, or rather earning a large estate. He is continually attentive to his grounds; and by that attention provides for the accurate culture of them, at a small, or at least a moderate expence. In a common year, his profits are considerable. In a year of plenty, he lays by a flock; and when, in the course of four or five years, crops in general fail, his stock fetches a large price, and he has a sure sale. It hath been computed by those who are esteemed the best judges, that in an acre of hops, producing to the value of 30*l.* one moiety goes clear into the pocket of the proprietor, and that the other moiety of it goes in discharge of the rent, tythe, and all other expences, except the duty by excise, which is, however, drawn back on exportation. The duties on hops imported are so high as to prevent their coming in, except in a time of extreme scarcity, when the brewery might be otherwise injured; and in many other respects provisions have been made by law to render the proprietors of so precarious a commodity as safe as possible.—The destroying hops while growing, hath been made felony without benefit of clergy.

HOPKINS (Ezekiel), bishop of Derry in Ireland, was the son of an obscure clergyman in Devonshire; and was for some time a chorister of Magdalen college, Oxford, and usher of the adjoining school. He was afterwards a Presbyterian minister, and was extolled as an excellent preacher. John, lord Roberts, happening to hear him preach, was so pleased with his person, his discourse, and his manner, that he retained him as his chaplain, when he was sent in quality of lord lieutenant into Ireland, and preferred him to the deanery of Raphoe; and, on his being recalled, so strongly recommended him to his successor, that he was soon preferred to the bishopric at Raphoe, whence he was translated to Derry. During the war under the earl of Tyrconnel, at the revolution, he withdrew into England; and was chosen minister of St Mary, Aldermanbury, in London, where he died in 1690. His sermons, his exposition of the ten commandments, and that of the Lord's prayer, are much esteemed. His works were printed together in 1710, folio. He was the father of Mr Charles Hopkins, several of whose poetical pieces are in Dryden's *Miscellanies*.

HOR, a mountain, or mountainous tract of Arabia Petræa, situated in that circuit which the Israelites took to the south and south-east of Edom in their way to the borders of Moab: on this mountain Aaron died. The inhabitants were called *Horites*. This tract was also called *Seir*, either from a native Horite, or from Esau, by way of anticipation from his hairy habit of body: whose posterity drove out the Horites.

HORAPOLLO, or HORUS APOLLO, a grammarian of Panopolis in Egypt, according to Suidas,

Hop
Horapollo.

Horatii
Hord.

who first taught at Alexandria, and then at Constantinople under the reign of Theodosius. There are extant under his name, two books on the hieroglyphics of the Egyptians; which Aldus first published in Greek in 1505, in folio; and they have often been published since, with a Latin version and notes. It is not certain, however, that the grammarian of Alexandria was the author of these books; they being rather thought to belong to another Horapollo of more ancient date: on which head, see *Fabricius's Bibliotheca Græca*.

HORATII, three Roman brothers, who, under the reign of Tullus Hostilius, fought against the three Curiatii, who belonged to the Albanian army. Two of the Horatii were first killed; but the third, by his address, successively slew the three Curiatii, and by this victory rendered the city of Alba subject to the Romans. See *Rome*.

HORATIUS, surnamed *Cocles* from his losing an eye in combat, was nephew to the consul Horatius Pulvillus, and descended from one of the three brothers who fought against the Curiatii. Porfenna, laying siege to Rome, drove the Romans from Janiculum; and pursued them to the wooden bridge over the Tiber, which joined the city to Janiculum. Largius, Herminius, and Horatius Cocles, sustained the shock of the enemy on the bridge, and prevented their entering the city with the Romans; but Largius and Herminius having passed the bridge, Horatius Cocles was left alone, and repulsed the enemy till the bridge was broken under him: he then threw himself armed into the Tyber, swam across the river, and entered Rome in triumph.

HORATIUS (Quintus Flaccus), the most excellent of the Latin Poets of the lyric and satyrical kind, and the most judicious critic in the reign of Augustus, was the grandson of a freedman, and was born at Venusium, 64 B. C. He had the best masters in Rome, after which he completed his education at Athens. Having taken up arms, he embraced the party of Brutus and Cassius, but left his shield at the battle of Philippi. Some time after, he gave himself up entirely to the study of polite literature and poetry. His talents soon made him known to Augustus and Mæcenas, who had a particular esteem for him, and loaded him with favours. Horace also contracted a strict friendship with Agrippa, Pollio, Virgil, and all the other great men of his time. He lived without ambition, and led a tranquil and agreeable life with his friends; but was subject to a fluxion in his eyes. He died at the age of 57. There are still extant his Odes, Epistles, Satires, and Art of Poetry; of which there have been a great number of editions. The best are those of the Louvre, in 1642, folio; of Paris, 1691, quarto; of Cambridge, 1699; and that with Bentley's emendations, printed at Cambridge in 1711.

HORD, in geography, is used for a company of wandering people, which have no settled habitation, but stroll about, dwelling in waggons, or under tents, to be ready to shift as soon as the herbage, fruit, and the present province, is eaten bare: such are several tribes of the Tartars, particularly those who inhabit beyond the Wolga, in the kingdom of Astracan and Bulgaria.

A hord consists of 50 or 60 tents, ranged in a circle,

and leaving an open place in the middle. The inhabitants in each hord usually form a military company or troop, the eldest whereof is commonly the captain, and depends on the general or prince of the whole nation.

HORDEUM, *BARLEY*, in botany, a genus of the triandria digynia class. The involucre consists of six leaves, and contains three flowers. There are eight species; only one of which, viz. the murinum, or wall-barley-grass, is a native of Britain. The native place of the vulgar, or common barley cultivated in our fields, is not known. For the culture, &c. of common barley, see *AGRICULTURE*, n° 118,—122.

HORDICALIA, or *HORDICOMIA*, in antiquity, a religious feast held among the Romans, wherein they sacrificed cattle big with young. This feast fell on April 15. on which day they sacrificed 30 cows with calf to the goddess Tellus or the Earth; part of them were sacrificed in the temple of Jupiter. The calves taken out of their bellies were burnt to ashes at first by the pontifices, afterwards by the eldest of the vestal virgins.

HOREB, or *OREB*, a mountain of Arabia Petrea, contiguous to and on the south side of mount Sinai; the scene of many miraculous appearances.

HOREHOUND, *BALLOTA*, or *Stachys*, in botany. See *MARRUBIUM*.

HORIZON, or *HORISON*, in geography and astronomy, a great circle of the sphere, dividing the world into two parts or hemispheres; the one upper and visible, the other lower and hid. The word is pure Greek, *ὁρίζων*, which literally signifies "bounding or terminating the sight;" being formed of *ὅρις*, *terminus*, *definitio*, "I bound, I limit;" whence it is also called *finitor*, "finisher."

The horizon is either *rational* or *sensible*.

Rational, *true*, or *astronomical* **HORIZON**, which is also called simply and absolutely the *horizon*, is a great circle, whose plane passes thro' the centre of the earth, and whose poles are the zenith and nadir. It divides the sphere into two equal parts, or hemispheres.

Sensible, *visible*, or *apparent* **HORIZON**, is a lesser circle of the sphere, which divides the visible part of the sphere from the invisible. Its poles, too, are the zenith and nadir: and consequently the *sensible horizon* is parallel to the *rational*; and it is cut at right angles, and into two equal parts, by the verticals.—The *sensible horizon* is divided into *eastern* and *western*. The *eastern* or *ortive horizon*, is that part of the horizon wherein the heavenly bodies rise. The *western* or *occidental horizon*, is that wherein the stars set. The altitude or elevation of any point of the sphere, is an arch of a vertical circle intercepted between it and the sensible horizon.

By *sensible horizon* is also frequently meant a circle, which determines the segment of the surface of the earth, over which the eye can reach; called also the *physical horizon*. In this sense we say, a spacious horizon, a narrow scanty horizon.

HORIZONTAL, something that relates to the horizon, is taken in the horizon, or on a level with the horizon.—We say, a horizontal plane, horizontal line, &c.

HORIZONTAL Dial, is that drawn on a parallel to the horizon; having its gnomon, or style, elevated ac-

Hordeu
Horizon

according to the altitude of the pole of the place it is designed for. Horizontal dials are, of all others, the most simple and easy. The manner of describing them, see under the article *DIAL*.

HORIZONTAL Line, in perspective, is a right line drawn through the principal point, parallel to the horizon: or, it is the intersection of the horizontal and perspective planes. See *PERSPECTIVE*.

HORIZONTAL Plane, is that which is parallel to the horizon of the place, or nothing inclined thereto.

The business of levelling, is to find whether two points be in the horizontal plane; or how much the deviation is. See *LEVELLING*.

HORIZONTAL Plane, in perspective, is a plane parallel to the horizon, passing through the eye, and cutting the perspective plane at right angles.

HORIZONTAL Projection. See *GEOGRAPHY*, n° 16, 19.

HORIZONTAL Range, or *Level Range*, of a piece of ordnance, is the line it describes, when directed parallel to the horizon or horizontal line. See *GUNNERY*, *passim*.

HORIZONTAL Moon. See *ASTRONOMY*, n° 172.

HORMINUM, CLARY; a genus of the gymnospermia order, belonging to the didynamia class of plants. There are several species; the most remarkable of which is the verbenacum, or common wild clary. It grows naturally on sandy and gravelly ground in many parts of Britain. It has sometimes been called *oculus Christi*, from the supposed virtues of its seeds in clearing the sight, which it does by its viscous covering; for when any thing happens to fall into the eye, if one of the seeds is put in at one corner, and the eyelid kept close over it, moving the seed gently along the eye, whatever happens to be there will stick to it, and so be brought out. The virtues of this are supposed to be the same as those of the garden clary, but not quite so powerful.

HORN, in physiology, a hard substance growing on the heads of divers animals, particularly the cloven-footed quadrupeds; and serving them both as weapons of offence and defence.

The horn of animals is of the same nature as their gelatinous matter; and is only that matter charged with a less quantity of water, and a larger quantity of earth, and sufficiently condensed to have a firm and solid consistence. By digesting horn with water in Papin's digester, it may be entirely converted into jelly.

Horn is a perfectly animalised matter, and furnishes in distillation the same principles as all animal-matters; that is, at first a pure phlegm, with a degree of heat not exceeding that of boiling water; then a volatile alkaline spirit, which becomes more and more penetrating and strong; a fetid, light, and thin oil; a concrete volatile salt, which forms ramifications upon the sides of the receiver; much air; fetid oil, which becomes more and more black and thick; and lastly, it leaves in the retort a considerable quantity of almost incombustible coal, from which, after its incineration, scarcely any fixed alkali can be obtained.

Animal oil, and particularly that which is drawn first in the distillation of horn, is susceptible of acquiring great thinness and volatility by repeated distillations, and is then called the *oil of dippe*.

The horns of flags, and of other animals of that

kind, are the most proper to furnish the animal oil to be rectified in the manner of dippe; because they yield the largest quantity. These horns also differ from the horns of other animals in this, that they contain a larger quantity of the same kind of earth which is in bones; hence they seem to possess an intermediate nature betwixt horns and bones.

Hart's-HORN. See *HART'S-HORN*.

Hart's-HORN calcined to Whiteness. The phlogiston of the coal of hart's-horn, although very difficultly combustible, may nevertheless be burnt with more ease than the coal of other horns, and with nearly the same facility as bones may. This coal, by being calcined with a long-continued and strong fire, is changed into a very white earth called *hart's-horn calcined to whiteness*. This earth is employed in medicine as an absorbent. It is given in dysenteries and labour-pains which are supposed to be caused by acrid and ill-digested matters. Hart's-horn calcined to whiteness and levigated, is the basis of Sydenham's white decoction, which is commonly prescribed in these diseases.

Hart's-HORN prepared philosophically. This name is given to hart's-horn deprived by water of almost all its gelatinous part, so that it becomes brittle; and when its outer part is taken off, it is thus rendered very white, and is applicable to the same uses as that which is calcined by fire.

Dyeing of HORN—Black is performed by steeping brags in aqua-fortis till it be returned green: with this the horn is to be washed once or twice, and then put into a warmed decoction of logwood and water. Green is begun by boiling it, &c. in alum-water; then with verdigrise, ammoniac, and white-wine vinegar; keeping it hot therein till sufficiently green. Red is begun by boiling it in alum-water, and finished by decoction in a liquor compounded of quick-lime steeped in rain-water, strained, and to every pint an ounce of Brazil-wood added. In this decoction the bone, &c. is to be boiled till sufficiently red.

Dr Lewis informs us that horns receive a deep black stain from solution of silver. It ought to be diluted to such a degree as not sensibly to corrode the subject; and applied two or three times, if necessary, at considerable intervals, the matter being exposed as much as possible to the sun, to hasten the appearance and deepening of the colour.

Dyeing or staining HORN to imitate Tortoise-shell.—The horn to be dyed must be first pressed into proper plates, scales, or other flat form; and the following mixture prepared. Take of quick-lime two parts, and of litharge one part; temper them together to the consistence of a soft paste with soap-ley. Put this paste over all the parts of the horn, except such as are proper to be left transparent, in order to give it a nearer resemblance of the tortoise-shell. The horn must remain in this manner covered with the paste till it be thoroughly dry; when, the paste being brushed off, the horn will be found partly opaque and partly transparent, in the manner of tortoise-shell; and when put over a foil, of the kind of latten called *assidue*, will be scarcely distinguishable from it. It requires some degree of fancy and judgment to dispose of the paste in such a manner as to form a variety of transparent parts, of different magnitudes and figures, to look like the effect of nature: and it will be an improvement to add semi-

Horn
Hornbeck.

semi-transparent parts; which may be done by mixing whitening with some of the paste to weaken its operation in particular places; by which spots of a reddish brown will be produced, which if properly interperfed, efpecially on the edges of the dark parts, will greatly increafe both the beauty of the work, and its fimilitude with the real tortoise-shell.

HORN is alfo a fort of mufical instrument of the wind kind; chiefly ufed in hunting, to animate and bring together the dogs and the hunters. The term anciently was, *wind a horn*; all horns being in thofe times compaffed: but fince ftraight horns are come in fashion, they fay *blow a horn*, and fometimes *found a horn*.—There are various leffons on a horn; as the recheat, double recheat, royal recheat, running or farewell recheat, &c. See RECHEAT.

Cape-Horn. See *Terra del Fuego*.

HORN-Beam, in botany. See CARPINUS.

HORN-Blend, is a black or green indurated bole or clay, confifting of fealy particles, which are diftinguifhable from thofe of mica, by being lefs fhining, thicker, and reftangular. It is generally found amongft iron ores, and fometimes intermixed with mica, forming a compact ftone.

Human Horns. In Dr Charles Leigh's natural hiftory of Lancashire, Cheshire, and the Peak in Derbyshire, is the print of a woman with two horns on her head. When fhe was 28 years of age an excrescence grew upon her head like a wen, which continued 30 years, and then grew into two horns. After four years fhe caft them, and in their place grew two others. After four years fhe caft thefe alfo; and the horns which were on her head in 1668 (the time when the account was written) were then loofe. Her picture and one of her horns are in Ashmole's mufeum. In the univerfity library at Edinburgh is preferved a horn which was cut from the head of Elizabeth Love, in the 50th year of her age. It grew three inches above the ear, and was growing feven years.

HORN-Fish, Gar-fish, or Sea-Needle. See Esox.

HORN-Work, in fortification, an outwork compofed of two demi-baftions joined by a curtain. See FORTIFICATION.

HORNBY, a town of Lancashire in England, feated on a branch of the river Lune, and beautified with a handfome parochial chapel. The ruins of a decayed caftle are ftill to be feen here. W. Long. 2. 20. N. Lat. 54. 6.

HORN-CASTLE, a town of Lincolnshire in England. It had a caftle, as the name imports; from the architecture of which, and the Roman coins that are fometimes dug up here, it is thought to have been a camp or ftation of the Romans. The town is well built, and is almoft furrounded with water. W. Long. o. 2. N. Lat. 51. 20.

HORNDON, a town in Effex, in England. It ftands near a rivulet, that at a fmall diftance from hence falls into the Thames, which is there called the *Hope*. E. Long. o. 30. N. Lat. 51. 20.

HORNECK (Dr Anthony), a learned and pious divine, was born at Baccharach, in the Lower Palatinate, in 1641. He ftudied divinity under Dr Spanheim at Heidelberg; and afterwards coming to England, completed his ftudies at Oxford, and became vicar of Allhallows in that city. In 1665, he removed

into the family of the duke of Albemarle; and was tutor to his grace's fon, then lord Torrington. The duke prefented him to the rectory of Doulton in Devonfhire, and procured for him a prebend in Exeter. He was afterwards chofen preacher of the Savoy. In 1693, he was collated to a prebend in Weftminfter, and the fame year admitted to a prebend in the cathedral of Wells. He publifhed, 1. The great law of confideration. 2. The happy afcetic. 3. Delight and judgment. 4. The fire of the altar. 5. The exercife of prayer. 6. The crucified Jesus. 7. Several fermons, and other works. He died in 1696, and was interred in Weftminfter abbey, where a monument is erected to his memory.

HORNERS, thofe people whofe bufinefs it is to prepare various utensils of the horns of cattle. The horners were a very ancient and confiderable fraternity in the city of London fome hundred years ago. In the reign of Edward II. they complained to parliament, that by foreigners buying up the horns in England, they were in danger of being ruined, and this bufinefs loft to the nation. For this reafon was made the ftatute 6 Edw. IV. by which the fale of horns to foreigners, (except fuch as the faid horners refufed), was prohibited; and the wardens had power granted them to fearch all the markets in London and 24 miles round, and to infpect Sturbridge and Ely fairs, to prevent fuch practices, and to purchafe horns at ftated prices. But on plausible pretences this law was repealed in the reign of James I. and thereupon the old evil revived. The horners again applied to parliament, and king Edward's ftatute was renewed (excepting as to the infpection of the fairs,) and ftill remains in force. The importation of unwrought horns into this country is alfo prohibited. In 1750, there were exported to Holland 514,500 lantern-leaves, befides powder-ftalks. There was formerly a duty of 20 fhillings a thoufand, under which in 1682 were exported 76,650; but in the reign of George I. this duty was taken off, and thefe and all other manufactures made of horns may be exported free. The prefent company of horners were incorporated January 12th 1638; and confift of a mafter, two wardens, and nine affiftants, without livery or hall. They have a warehouse in Spitalfields, to which the horns are fent as brought from town and country markets, and thence regularly divided, the widows and orphans of deceased members having equal fhares.

HORNET, in zoology, a very bold and venomous infect of the flying kind. It greatly refembles the wafp; only it is twice as large, and the head is of a longer and flenderer fhape, and the eyes formed fomething in the figure of a half moon. They build under ground, and in winter hide themfelves in hollow trees. They feed on fleft, and when very hungry will feize upon a fmall bird. Mouffet relates, that they have been feen fingly to purfue and kill a fparrow, and afterwards feed on its fleft.—Mr Evelyn informs us, that they are very pernicious to trees, and will peel them round to the very timber, as if they had been unbarked by cattle. They are deftroyed by ftopping up their entrances with tar or goofe-dung, or conveying the fumes of brimftone into their cells.

HORNET-FLY, in natural hiftory, a very large two-winged fly, which has the fhape and colours of the horn-

Horn
Horn

horn-

Horned

Horse.

hornet, and is at first light scarce to be distinguished from it. The principal colour of the body of this fly is yellow; but it has two long and large black lines placed transversely upon it, and has a black corcelet and a yellow head. These lay, at a proper season, a large number of oblong white eggs, which hatch into large and long worms, whose chief food is the worms and nymphs of the humble bees. The worm of this fly is continually found in the nests of these bees, where it never meddles with the wax or honey, but preys only upon the young offspring of the creature.

HORNING, in Scots law, a writing issuing from the signet, in his majesty's name, at the instance of a creditor against his debtor, commanding him to pay or perform within a certain time.

HORNSEY, a town in Yorkshire, in England. It is almost surrounded by a small arm of the sea; and the church having a high steeple, is a noted sea-mark. Not many years ago there was a street here called *Hornsey beach*, which was washed away by the sea, except a house or two. E. Long. o. 6. N. Lat. 54. o.

HOROLOGIUm, a general name for instruments to measure the hours, as a watch, clock, dial, &c. See **DIAL** and **WATCH**.

HOROSCOPE, in astrology, is the degree of the ascendant, or the star that rises above the horizon at a certain moment, which is observed in order to predict some future event, as the success of a design, the fortune of a person who was at that instant born, &c.

HOROSCOPY. See **DIVINATION**, n° 2.

HORROX (Jeremiah), an eminent English astronomer in the 17th century, was born at Texteth near Liverpool in Lancashire in 1619. He died, to the great loss of that science and of the world, in the 23d year of his age, after he had just finished his *Venus in sole visa*; which, with some other works, were published by Dr Wallis, in quarto.

HORROR, strictly signifies such an excess of fear as makes a person tremble.—In medicine, it denotes a shivering and shaking of the whole body, coming by fits. It is common at the beginning of all fevers, but is particularly remarkable in those of the intermittent kind. See (*Index* subjoined to) **MEDICINE**.

HORSE, in zoology. See the article **EQUUS**.

Hunting-Horse, a name given to a horse qualified to carry a person in the chase. The shape of the horse designed for this service should be strong, and well knit together, as the jockeys express it. Irregular or unequal shapes in these creatures are always a token of weakness. The inequalities in shape, which shew a horse improper for the chase, are the having a large head and a small neck, a large leg and a small foot, &c. The head of a hunting horse indeed should always be large, but the neck should also be thick and strong to support it. The head should be lean, the nostrils wide, and the wind-pipe straight. In order to his behaving well in the field, he ought to have great care and indulgence in the stable; to have as much rest and quiet as may be; to be kept well supplied with good meat, clean litter, and fresh water by him; he should be often dressed, and suffered to sleep as much as he pleases. He should be fed in such a manner as that his dung may be rather soft than hard, and it must be of a bright and clean colour. All this

may be easily managed by the continual observance and change of his food as occasion requires. After his usual coverings, he should have exercise, and masses of sweet malt; and bread and beans, or wheat and beans mixed together, are to be his best food, and beans and oats his worst.

There is a general practice among groomers, of giving their hunting horses wheat-straw, as soon as they take them up from the grass. They say they do this to take up their bellies; but there seems to be much reason for disapproving such a practice. The change is very violent, and the nature of the straw so heating and drying, that there seems great reason to fear, that the stringent nature of it would be prejudicial more than at first is perceived. It is always found, that the dung is hard after this food, and is voided with pain and difficulty, which is in general very wrong for this kind of horses. It is better, therefore, to avoid this straw-feeding; and to depend upon moderate airing, warm clothing, good old hay, and old corn, than to have recourse to any thing of this kind.

It is a rule with all staunch sportsmen, that no horse should be used in hunting till he is five years old. Some will hunt them at four: but the horse at this time is not come up to his true strength and courage; and will not only fail at any tough trials, but will be subject to strains and accidents of that kind, much more than if he was kept for another year, when his strength would be more confirmed.

Management of a Horse upon and after a Journey. See that his shoes be not too strait, or press his feet, but be exactly shaped; and let him be shod some days before you begin a journey, that they may be settled to his feet.

Observe that he is furnished with a bitt proper for him, and by no means too heavy, which may incline him to carry low, or to rest upon the hand when he grows weary, which horsemen call *making use of his fifth leg*. *Sportsm.* *Diff.*

The mouth of the bitt should rest upon his bars about half a finger's-breadth from his tusks, so as not to make him fumble his lips; the curb should rest in the hollow of his beard a little above the chin; and if it gall him, you must defend the place with a piece of buff, or other soft leather.

Take notice that the saddle do not rest upon his withers, reins, or back-bone, and that one part of it do not press his back more than another.

Some riders gill a horse's sides below the saddle with their stirrup-leathers, especially if he be lean; to hinder it, you should fix a leather-strap between the points of the fore and hind-bows of the saddle, and make the stirrup-leather pass over them.

Begin your journey with short marches, especially if your horse has not been exercised for a long time: suffer him to stale as often as you find him inclined; and not only so, but invite him to it: but do not excite your mares to stale, because their vigour will be thereby diminished.

It is advisable to ride very softly, for a quarter or half an hour before you arrive at the inn, that the horse not being too warm, nor out of breath, when put into the stable, you may unbridle him: but if your business obliges you to put on sharply, you must

Horse.

then (the weather being warm) let him be walked in a man's hand, that he may cool by degrees; otherwise, if it be very cold, let him be covered with cloths, and walked up and down in some place free from wind; but in case you have not the convenience of a sheltered walk, stable him forthwith, and let his whole body be rubbed and dried with straw.

Although some people will have their horses legs rubbed down with straw as soon as they are brought into the stable, thinking to supple them by that means; yet it is one of the greatest errors that can be committed, and produces no other effects than to draw down into the legs those humours that are always stirred up by the fatigue of the journey: not that the rubbing of horses legs is to be disallowed; on the contrary, we highly approve of it, only would not have it done at their first arrival, but when they are perfectly cooled.

Being come to your inn, as soon as your horse is partly dried, and ceases to beat in the flanks, let him be unbridled, his bitt washed, cleaned, and wiped, and let him eat his hay at pleasure.

If your horse be very dry, and you have not given him water on the road, give him oats washed in good mild ale.

The dust and sand will sometimes so dry the tongues and mouths of horses, that they lose their appetites: in such case, give them bran well moistened with water to cool and refresh their mouths; or wash their mouths and tongues with a wet sponge, to oblige them to eat.

The foregoing directions are to be observed after moderate riding; but if you have rid excessively hard, unfaddle your horse, and scrape off the sweat with a sweating-knife, or scraper, holding it with both hands, and going always with the hair; then rub his head and ears with a large hair-cloth, wipe him also between the fore-legs and hind-legs; in the mean while, his body should be rubbed all over with straw, especially under his belly and beneath the saddle, till he is thoroughly dry.

That done, set on the saddle again, cover him; and if you have a warm place, let him be gently led up and down in it, for a quarter of an hour; but if not, let him dry where he stands.

Or you may unfaddle him immediately; scrape off the sweat; let the ostler take a little vinegar in his mouth, and squirt it into the horse's; then rub his head, between the fore and hind-legs, and his whole body, till he is pretty dry: let him not drink till thoroughly cool and has eaten a few oats; for many, by drinking too soon, have been spoiled. Set the saddle in the sun or by a fire, in order to dry the pannels.

When horses are arrived in an inn, a man should, before they are unbridled, lift up their feet, to see whether they want any of their shoes; or if those they have do not rest upon their sides; afterwards he should pick and clear them of the earth and gravel, which may be got twixt their shoes and soles.

If you water them abroad, upon their return from the river, cause their feet to be flopped with cow-dung, which will ease the pain therein; and if it be in the evening, let the dung continue in their feet all night, to keep them soft and in good condition: but

if your horse have brittle feet, it will be requisite to anoint the fore-feet, at the on-setting of the hoofs, with butter, oil, or hog's-grease, before you water him in the morning, and in dry weather they should be also greased at noon.

Many horses, as soon as unbridled, instead of eating, lay themselves down to rest, by reason of the great pain they have in their feet, so that a man is apt to think them sick: but if he looks to their eyes, he will see they are lively and good; and if he offers them meat as they are lying, they will eat it very willingly; yet if he handles their feet, he will find them extremely hot, which discovers their suffering in that part. You must therefore see if their shoes do not rest upon their soles, which is somewhat difficult to be certainly known, without unhoofing them; but if you take off their shoes, then look to the inside of them, and you may perceive that those parts which rest upon the soles are more smooth and shining than the others: in this case you are to pare their feet in those parts, and fix on their shoes again, anointing the hoofs, and stopping the soles, with scalding hot black pitch or tar.

After a long day's journey, at night feel your horse's back, if he be pinched, galled, or swelled, (if you do not immediately discover it, perhaps you may after supper), there is nothing better than to rub it with good brandy and the white of an egg. If the galls are between the legs, use the same remedy; but if the ostler rubs him well between the legs, he will seldom be galled in that part.

In order to preserve horses after travel, take these few useful instructions. When you are arrived from a journey, immediately draw the two heel-nails of the fore-feet; and, if it be a large shoe, then four: two or three days after, you may blood him in the neck, and feed him for ten or twelve days only with wet bran, without giving him any oats; but keep him well littered.

The reason why you are to draw the heel-nails, is because the heels are apt to swell, and if they are not thus eased, the shoes would press and straiten them too much: it is also advisable to stop them with cow-dung for a while; but do not take the shoes off, nor pare the feet, because the humours are drawn down by that means.

The following bath will be very serviceable for preserving your horse's legs. Take the dung of a cow or ox, and make it thin with vinegar, so as to be of the consistence of thick broth; and having added a handful of small salt, rub his fore-legs from the knees, and the hind-legs from the gambrels, chafing them well with and against the hair, that the remedy may sink in and stick to those parts, that they may be all covered over with it. Thus leave the horse till morning, not wetting his legs, but giving him his water that evening in a pail: next morning lead him to the river, or wash his legs in well-water, which is very good, and will keep them from swelling.

Those persons, who, to recover their horses feet, make a hole in them, which they fill with moistened cow-dung, and keep it in their fore-feet during the space of a month, do very ill; because, though the continual moisture that issues from the dung occasions the growing of the hoof, yet it dries and shrinks

Horse.

shrinks it so excessively when out of that place, that it splits and breaks like glass, and the foot immediately straitens. For it is certain, that cow-dung (contrary to the opinion of many people) spoils a horse's hoof: it does indeed moisten the sole; but it dries up the hoof, which is of a different nature from it. In order, therefore, to recover a horse's feet, instead of cow-dung, fill a hole with blue wet clay, and make him keep his fore-feet in it for a month.

Mild horses that are fatigued, or over-rid, and made lean by long journeys, have their flanks altered without being purly, especially vigorous horses that have worked too violently.

There is no better method to recover them, than to give each of them in the morning half a pound of honey very well mingled with scalded bran; and when they readily eat the half pound, give them the next time a whole one, and afterwards two pounds, every day continuing this course till your horses are empty, and purge kindly with it; but as soon as you perceive that their purging ceases, forbear to give them any more honey.

You may administer powder of liquorice in the scalded bran for a considerable time; and to cool their blood, it will not be improper to let them have three or four glisters.

In case the horse be very lean, it is expedient to give him some wet bran, over and above his proportion of oats; and grass is also extraordinary beneficial; if he be not purly.

If it be a mare, put her to a horse; and if she never had a foal before, it will enlarge her belly.

Sometimes excessive feeding may do horses more harm than good, by rendering them subject to the farcy. You should therefore be cautious in giving them too great a quantity at a time, and take a little blood from them now and then.

When a horse begins to drink it heartily, it is a certain sign that he will recover in a short time. As to the method of giving him water during a journey, observe the following rules:

All the while you are upon a journey, let your horse drink of the first good water you come to, after seven o'clock in the morning if it be in summer-time, and after nine or ten in winter.

That is accounted good water, which is neither too quick and piercing, nor too muddy and stinking.

This is to be done, unless you would have him gallop a long time after drinking; for if so, you must forbear.

Though it is the custom of England to run and gallop horses after drinking, which we call *watering-courses*, to bring them (as they say) into wind; yet, says M. de Solleysfel, it is the most pernicious practice that can be imagined for horses, by which many are rendered purly.

While a horse is drinking, draw up his head five or six times, making him move a little between every draught; and notwithstanding he be warm, and sweat very much, yet if he is not quite out of breath, and you have still four or five miles to ride, he will be better after drinking a little, than if he had drank none at all: it is true, indeed, that if the horse is very warm, you should, at coming out of the water, redouble your pace, to make him go at a gentle trot, to warm

the water in his belly.

You ought to let him drink after this manner during the whole time of your journey: because, if when you happen to bait he be hot or sweaty, you must not let him drink for a long time, as it would endanger his life; and when his bridle is taken off, his excessive thirst will hinder him from eating, so that he will not offer to touch his meat for an hour or two, which perhaps your occasions will not allow you for a baiting time, and not to have any food will render him unfit for travel.

If you meet with any ford before you come to your inn, ride the horse through it two or three times, but not up to his belly: this will not only cleanse his legs; but the coldness of the water will bind up the humours, and prevent them from descending.

If your horse has been very warm, and you have not had the convenience of watering him upon the road, he will, when unbridled, eat but very little; therefore he should have his oats given him washed in ale or beer, or only some of them, if you intend to feed him again after he has drank.

Some are of opinion, that horses are often spoiled by giving them oats before their water; because they say, the water makes the oats pass too soon, and out of the stomach undigested. But M. de Solleysfel affirms, that though it be the common custom not to do it till after, yet it is proper to feed with oats both before and after, especially if the horse be warm, and has been hard rid; for they will be a great deal the better for it, and in no danger of becoming sick.

HORSE-Chestnut. See *ÆSCULUS*.

HORSE-Guards. See *GUARDS*.

HORSE-Muscle. See *MUSCLE*.

HORSE-Radish. See *COCHLEARIA*.

HORSE-Shoes. See *SHOEING*.

HORSE-Vetch. See *HIPPOCREPIS*.

Animated HORSE-Hairs, a term used to express a sort of long and slender water-worm of a blackish colour, and so much resembling a horse-hair that it is generally, by the vulgar, supposed to be the hair fallen from a horse's mane into the water as he drinks, and there animated by some strange power. Dr Lister has at large confuted this opinion in the *Philosophical Transactions*. See the article *SETACEOUS Worms*.

Breeding of HORSES. When the stallion is chosen, and all the mares intended for him are collected together, there must be another stone-horse, to discover which of the mares are in heat; and, at the same time, contribute to inflame them. All the mares are to be brought successively to this stone-horse; which should also be enflamed, and suffered frequently to neigh. As he is for leaping every one, such as are not in heat keep him off, whilst those which are so suffer him to approach them. But instead of being allowed to satisfy his impulse, he must be led away, and the real stallion substituted in his stead. This trial is necessary for ascertaining the true time of the mare's heat, especially of those which have not yet had a colt; for with regard to such as have recently foaled, the heat usually begins nine days after their delivery; and on that very day they may be led to the stallion to be covered; and nine days after, by the experiment above-mentioned, it may be known whether they are still in heat. If they are, they must be covered a second time; and

Buffon's
Nat. Hist.

thus successively every ninth day while their heat continues: for when they are impregnated, their heat abates, and in a few days ceases entirely.

But that every thing may be done easily and conveniently, and at the same time with success and advantage, great attention, expence and precaution are requisite. The stud must be fixed in a good soil, and in a suitable place, proportioned to the number of mares and stallions intended to be used. This spot must be divided into several parts, inclosed with rails or ditches well fenced; in the part where the pasture is the richest, the mares in fold, and those with colts by their sides, are to be kept. Those which are not impregnated, or have not yet been covered, are to be separated, and kept with the fillies in another close, where the pasture is less rich, that they may not grow too fat, which would obstruct the progress of generation. Lastly, the young stone colts, or geldings, are to be kept in the driest part of the fields, and where the ground is most unequal; that by running over the uneven surface, they may acquire a freedom in the motion of their legs and shoulders. This close, where the stone colts are kept, must be very carefully separated from the others, lest the young horses break their bounds, and enervate themselves with the mares. If the tract be so large as to allow of dividing each of these closes into two parts, for putting oxen and horses into them alternately, the pasture will last much longer than if continually eaten by horses; the ox improving the fertility, whereas the horse lessens it. In each of these closes should be a pond; standing water being better than running, which often gripes them: and if there are any trees in the ground, they should be left standing, their shade being very agreeable to the horses in great heats; but all stems or stumps should be grubbed up, and all holes levelled, to prevent accidents. In these pastures your horses should feed during the summer; but in the winter the mares should be kept in the stable and fed with hay. The colts also must be housed, and never suffered to feed abroad in winter, except in very fine weather. Stallions that stand in the stable should be fed more with straw than hay; and moderately exercised till covering time, which generally lasts from the beginning of April to the end of June. But during this season they should have no other exercise, and be plentifully fed, but with the same food as usual. Before the stallion is brought to the mare, he should be dressed, as that will greatly increase his ardour. The mare must also be curried, and have no shoes on her hind feet, some of them being ticklish, and will kick the stallion. A person holds the mare by the halter, and two others lead the stallion by long reins; when he is in a proper situation, another assistant carefully directs the yard, pulling aside the mare's tail, as a single hair might hurt him dangerously. It sometimes happens that the stallion does not complete the work of generation, coming from the mare without making any injection: it should therefore be attentively observed, whether, in the last moments of the copulation, the dock of the stallion's tail has a vibrating motion; for such a motion always accompanies the emission of the seminal lymph. If he has performed the act, he must on no consideration be suffered to repeat it; but be led away directly to the stable, and there kept two days. For, however able a

good stallion may be of covering every day during the three months, it is much better to let him be led to a mare only every other day: his produce will be greater, and he himself less exhausted. During the first seven days, let four different mares be successively brought to him; and the ninth day let the first be again brought, and so successively while they continue in heat: but as soon as the heat of any one is over, a fresh mare is to be put in her place, and covered in her turn every nine days; and as several retain even at the first, second, or third time, it is computed that a stallion, by such management, may, during the three months, cover 15 or 18 mares, and beget 10 or 12 colts. These animals have a very large quantity of the seminal lymph; so that a considerable portion of it is shed during the emission. In the mares likewise is an emission, or rather distillation of the seminal lymph, during the whole time they are horning; ejecting a viscid whitish lymph, called the *heats*, which cease on conception. This liquor the Greeks called *hippomanes*; and pretended that philtres might be made of it, one remarkable effect of which was, to render a horse frantic with lust. This *hippomanes* is very different from that found in the secundines of the foal, which Mr Daubenton first discovered, and has so accurately described its nature, origin, and situation. The ejection of this liquor is the most certain sign of the mare's heat; but it is also known by the inflation of the lower part of the vulva, by her frequent neighings, and attempts to get to the horses. After being covered, nothing more is requisite than to lead her away to the field. The first foal of a mare is never so strongly formed as the succeeding; so that care should be taken to procure for her, the first time, a larger stallion, that the defect of the growth may be compensated by the largeness of the size. Particular regard should also be had to the difference or congruity of the fashion of the stallion and the mare, in order to correct the faults of the one by the perfections of the other: especially never to make any disproportionate copulations, as of a small horse with a large mare, or a large horse with a small mare; as the produce of such copulation would be small, or badly proportioned. It is by gradations that we must endeavour to arrive at natural beauty: for instance, to give to a mare a little too clumsy, a well-made horse and finely shaped; to a small mare, a horse a little higher; to a mare which is faulty in her forehead, a horse with an elegant head and noble chest, &c.

It has been observed, that horses fed in dry and light grounds, produce temperate, swift, and vigorous foals, with muscular legs and a hard hoof; while the same bred in marshes and moist pastures have produced foals with a large heavy head, a thick carcass, clumsy legs, bad hoofs, and broad feet. These differences proceed from the air and food, which is easily understood; but what is more difficult to be accounted for, and still more essential than what we have hitherto observed, is, to be continually crossing the breed to prevent a degeneracy.

In coupling of horses, the colour and size should be suited to each other, the shape contrasted, and the breed crossed by an opposition of climates: but horses and mares foaled in the same stud should never be joined. These are essential articles; but there are others which should

should by no means be neglected: as that no short-docked mares be suffered in a stud, because from their being unable to keep off the flies, they are much more tormented by them than others which have a long sweeping tail; and their continual agitations from the stings of these insects, occasions a diminution in the quantity of their milk, and has a great influence on the constitution and size of the colt, which will be vigorous in proportion as its dam is a good nurse. Care must also be taken, that the stud mares be such as have been always brought up in pastures, and never over-worked. Mares which have always been brought up in the stable on dry food, and afterwards turned to grass, do not breed at first: some time is required for accustoming them to this new aliment.

Though the usual season for the heat of mares be from the beginning of April to the end of June, yet it is not uncommon to find some among a large number, that are in heat before that time: but it is advisable to let this heat pass over without giving them to the stallion, because they would foal in winter; and the colts, besides the inclemency of the season, would have bad milk for their nourishment. Again, if the mares are not in heat till after the end of June, they should not be covered that season; because the colts being foaled in summer, have not time for acquiring strength sufficient to repel the injuries of the following winter.

Many, instead of bringing the stallion to the mare, turn him loose into the close, where all the mares are brought together; and there leave him to choose such as will stand to him. This is a very advantageous method for the mares: they will always take horse more certainly than in the other; but the stallion, in six weeks, will do himself more damage than in several years by moderate exercise, conducted in the manner we have already mentioned.

When the mares are pregnant, and their belly begins to swell, they must be separated from those that are not, lest they hurt them. They usually go 11 months and some days; and foal standing, whereas most other quadrupeds lie down. Those that cannot foal without great difficulty, must be assisted; the foal must be placed

in a proper situation; and sometimes, if dead, drawn out with cords. The head of the colt usually presents itself first, as in all other animals: at its coming out of the matrix, it breaks the secundines or integuments that inclose it, which is accompanied with a great flux of the lymph contained in them; and at the same time one or more solid lumps are discharged, formed by the sediment of the inspissated liquor of the allantoides. This lump, which the ancients called the *hippomenes of the colt*, is so far from being, as they imagined, a mass of flesh adhering to the head of the colt, that it is separated from it by a membrane called *amnios*. As soon as the colt is fallen, the mare licks it, but without touching the hippomenes; which points out another error of the ancients, who affirmed that she instantly devours it.

The general custom is, to have a mare covered nine days after her foaling, that no time may be lost; but it is certain, that the mare having, by this means, both her present and future foal to nourish, her ability is divided, and she cannot supply both so largely as she might one only. It would therefore be better, in order to have excellent horses, to let the mares be covered only every other year; they would last the longer, and bring foals more certainly: for, in common studs, it is so far from being true that all mares which have been covered bring colts every year, that it is considered as a fortunate circumstance if half or at most two thirds of them foal.

Mares, when pregnant, will admit of copulation; but it is never attended with any superfecundation. They usually breed till they are 14 or 15 years of age; and the most vigorous till they are above 18. Stallions, when well managed, will engender till the age of 20, and even beyond; but it must be observed, that such horses as are soonest made stallions, are also the soonest incapable of generation: thus the large horses, which acquire strength sooner than the slender, and are therefore often used as stallions as soon as they are four years old, are incapable of generation before they are sixteen.

Gelding of HORSES. See GELDING.

Rearing of HORSES. See COLT.

H O R S E M A N S H I P;

Or, The Art of Riding, and of Training and Managing HORSES.

SECT. I. *The method of preparing horses to be mounted.*

THOUGH all horses are generally bought at an age when they have already been backed, they should be begun and prepared for the rider with the same care, gentleness and caution, as if they had never been handled or backed, in order to prevent accidents, which might else arise from skittishness or other causes: and as it is proper that they should be taught the figure of the ground they are to go upon when they are at first mounted, they should be previously trotted in a *longe* on circles, without any one upon them.

The manner of doing this is as follows: Put an easy *snaffle* round the horse's nose, and make him go forwards upon you, standing quiet and holding the

longe; and let another man, if you find it necessary, follow him with a whip. All this must be done very gently, and but a little at a time: for more horses are spoiled by overmuch work, than by any other treatment whatever; and that by very contrary effects; for sometimes it drives them into vice, madness, and despair, and often stupifies and totally dispirits them.

The first obedience required in a horse is going forwards: till he perform this duty freely, never even think of making him rein back, which would inevitably make him restive: as soon as he goes forwards readily, stop and caress him. You must remember in this, and likewise in every other exercise, to use him to go equally well to the right and left; and when he obeys, caress him and dismiss him immediately. If a horse, that is very young, takes fright and stands still, lead.

Earl of Pembroke's Directions.

Breaking of
horses.

lead on another horse before him, which probably will induce him instantly to follow. Put a snaffle in his mouth; and when he goes freely, saddle him, girthing him at first very loose. Let the cord, which you hold, be long and loose; but not so much so as to endanger the horse's entangling his legs in it. It must be observed, that small circles, in the beginning, would constrain the horse too much, and put him upon descending himself. No bend must be required at first: never suffer him to gallop false; but whenever he attempts it, stop him without delay, and then set him off afresh. If he gallops of his own accord, and true, permit him to continue it; but if he does it not voluntarily, do not demand it of him at first. Should he fly and jump, shake the cord gently upon his nose without jerking it, and he will fall into his trot again. If he stands still, plunges or rears, let the man who holds the whip make a noise with it; but never touch him, till it be absolutely necessary to make him go on. When you change hands, stop and caress him, and entice him by fair means to come up to you: for by presenting yourself, as some do, on a sudden before horses, and frightening them to the other side, you run a great risk of giving them a thynels. If he keeps his head too low, shake the *caveçon* to make him raise it: and in whatever the horse does, whether he walks, trots, or gallops, let it be a constant rule, that the motion be determined and really such as is intended, without the least shuffling, pacing, or any other irregular gait.

SECT. II. *The method of placing the rider and rendering him firm on horseback, with some occasional instructions for riders and the horses.*

It is necessary that the greatest attention, and the same gentleness that is used in teaching the horses, be observed likewise in teaching the rider, especially at the beginning. Every method and art must be practised to create and preserve, both in man and horse, all possible feeling and sensibility; contrary to the usage of most riding-masters, who seem industriously to labour at abolishing these principles both in one and the other. As so many essential points depend upon the manner in which a man is at first placed on horseback, it ought to be considered and attended to with the strictest care and exactness.

The absurdity of putting a man, who perhaps has never before been upon a horse, on a rough trotting horse, on which he is obliged to stick with all the force of his arms and legs, is too obvious to need mentioning. This rough work, all at once, is plainly as detrimental at first, as it is excellent afterwards in proper time. No man can be either well or firmly seated on horseback, unless he be master of the balance of his body, quite unconstrained, with a full possession of himself, and at his ease: none of which requisites can he enjoy, if his attention be otherwise engaged; as it must wholly be in a raw, un-supplied, and un-prepared lad, who is put at once upon a rough horse: in such a distressful state, he is forced to keep himself on at any rate, by holding to the bridle (at the expense of the sensibility both of his own hand and the horse's mouth), and by clinging with his legs, in danger of his life, and to the certain depravation of a right feeling in the horse.

The first time a man is put on horseback, it ought to be upon a very gentle one. He never should be made to trot, till he is quite easy in the walk; nor gallop, till he is able to trot properly. The same must be observed in regard to horses: they should never be made to trot till they are obedient, and their months are well formed on a walk; nor be made to gallop, till the same be effected on a trot. When he is arrived at such a degree of firmness in his seat, the more he trots, and the more he rides rough horses, the better. This is not only the best method, but also the easiest and the shortest: by it a man is soon made sufficiently an horseman for a soldier; but by the other detestable methods that are commonly used, a man, instead of improving, contracts all sorts of bad habits, and rides worse and worse every day; the horse too becomes, daily more and more unfit for use. In proceeding according to the manner proposed, a man is rendered firm and easy upon the horse, both his own and the horse's sensibility is preserved, and each in a situation fit to receive and practise all lessons effectually.

Among the various methods that are used of placing people on horseback, few are directed by reason. Before you let the man mount, teach him to know, and always to examine, if the curb be well placed, (that is, when the horse has a bit in his mouth, which at first he should not; but only a snaffle, till the rider is firm in his seat, and the horse also somewhat taught); likewise to know if the nose-band be properly tight; the throat-band loose; and the mouth-piece neither too high nor too low in the horse's mouth, but rightly put so as not to wrinkle the skin nor to hang lax; the girths drawn moderately, but not too tight; and the crupper and the breast-plate properly adjusted. A very good and careful man may venture on a bit at first, and succeed with it full as well as by beginning with a snaffle alone: on colts, indeed, it is better, in all schools whatsoever, to avoid any pressure on the bars just at first, which a curb, though ever so delicately used, must in some degree occasion. When the bridle, &c. have been well looked to, let the man approach the horse gently near the shoulder; then taking the reins and an handful of the mane in his left hand, let him put his foot softly in the left stirrup, by pulling it towards him, let him touch the horse with his toe; then raising himself up, let him rest a moment on it with his body upright, but not stiff; and after that, passing his right leg clear over the saddle without rubbing against anything, let him seat himself gently down. He must be cautious not to take the reins too short, for fear of making the horse rear, run, or fall back, or throw up his head; but let him hold them of an equal length, neither tight nor slack, and with the little finger betwixt them. It is fit that horses should be accustomed to stand still to be mounted, and not to stir till the rider pleases. All soldiers should be instructed to mount and dismount equally well on both sides, which may be of great use in times of hurry and confusion. Then place the man in his saddle, with his body rather back, and his head held up with ease, without stiffness; seated neither forwards, nor very backwards; with the breast pushed out a little, and the lower part of the body likewise a little forwards; the thighs and legs turned in without constraint, and

of placing
the rider.

and the feet in a straight line, neither turned in nor out. By this position, the natural weight of the thighs has a proper and sufficient pressure of itself, and the legs are in readiness to act when called upon: they must hang down easy and naturally; and be so placed, as not to be wriggling about, touching and tickling the horse's sides, but always near them in case they should be wanted, as well as the heels.

The body must be carefully kept easy and firm, and without any rocking when in motion; which is a bad habit very easily contracted, especially in galloping. The left elbow must be gently leant against the body, a little forwards: unless it be so rested, the hand cannot be steady, but will always be checking, and consequently have pernicious effects on the horse's mouth. And the hand ought to be of equal height with the elbow; if it were lower, it would constrain and confine the motion of the horse's shoulders: but, as the mouths of horses are different, the place of the hand also must occasionally differ: a leaning, low, heavy fore-hand requires a high hand; and a horse that pokes out his nose, a low one. The right-hand arm must be placed in symmetry with the left; only let the right hand be a little forwarder or backwarder, higher or lower, as occasions may require, in order that both hands may be free: both arms must be a little bent at the elbow, to prevent stiffness.

A soldier's right hand should be kept unemployed in riding; it carries the sword, which is a sufficient business for it.

There remains one farther observation, that ought not to be omitted, about the hand, that it must be kept clear of the body; i. e. about two inches and a half forwards from it, with the nails turned opposite to the belly, and the wrist a little rounded with ease; a position not less graceful than ready for slackening, tightening, and moving the reins from one side to the other, as may be found necessary.

When the men are well placed, the more rough trotting they have without stirrups, the better; but with a strict care always, that their position be preserved very exactly. In all cases, great care must be taken to hinder their clinging with their legs: in short, no sticking by hands or legs is ever to be allowed of at any time. If the motion of the horse be too rough, slacken it, till the rider grows by degrees more firm: and when he is quite firm and easy on his horse in every kind of motion, stirrups may be given him; but he must never leave off trotting often without any.

The stirrups must be neither short nor long; but of such a length, that when the rider, being well placed, puts his feet into them, (about one third of the length of each foot from the point of it,) the points may be between two and three inches higher than the heels. The rider must not bear upon his stirrups, but only let the natural weight of his legs rest on them: For if he bear upon them, he would be raised above and out of his saddle; which should never be, except in charging sword in hand, with the body inclined forwards at the very instant of attacking. Spurs may be given, as soon as the rider is grown familiar with stirrups; or even long before, if his legs are well placed.

A hand should always be firm, but delicate: a horse's mouth should never be surprised by any sudden

transition of it, either from slack to tight, or from tight to slack. Every thing in horsemanship must be effected by degrees, but at the same time with spirit and resolution. That hand which, by giving and taking properly, gains its point with the least force, is the best; and the horse's mouth, under this same hand's directions, will also consequently be the best, supposing equal advantages in both from nature. This principle of gentleness should be observed upon all occasions in every branch of horsemanship. Sometimes the right hand may be necessary, upon some troublesome horses, to assist the left: but the seldom is this done, the better; especially in a soldier, who has a sword to carry, and to make use of.

The snaffle must on all occasions be uppermost; that is to say, the reins of it must be above those of the bridle, whether the snaffle or the bit be used separately, or whether they be both used together. When the rider knows enough, and the horse is sufficiently prepared and settled to begin any work towards suppling, one rein must be shortened according to the side worked to; but it must never be so much shortened, as to make the whole strength rest on that rein alone: for, not to mention that the work would be false and bad, one side of the horse's mouth would by that means be always deadened; whereas, on the contrary, it should always be kept fresh by its own play, and by the help of the opposite rein's acting delicately in a somewhat smaller degree of tension; the joint effect of which produces in a horse's mouth the proper, gentle, and easy degree of *appui* or bearing.

A coward and a madman make alike bad riders, and are both alike discovered and confounded by the superior sense of the creature they are mounted upon, who is equally spoiled by both, though in very different ways. The coward, by suffering the animal to have his own way, not only confirms him in his bad habits, but creates new ones in him: and the madman, by false and violent motions and corrections, drives the horse, through despair, into every bad and vicious trick that rage can suggest.

It is very requisite in horsemanship, that the hand and legs should act in correspondence with each other in every thing; the latter always subservient and assistant to the former. Upon circles, in walking, trotting, or galloping, the outward leg is the only one to be used, and that only for a moment at a time, in order to set off the horse true, or put him right if he be false; and as soon as that is done, it must be taken away again immediately: but if the horse be lazy, or otherwise retains himself, both legs must be used, and pressed to his sides at the same time together. The less the legs are used in general, the better. Very delicate good riders, with horses they have dressed themselves, will scarcely ever want their help. By the term *outward* is understood the side which is more remote from the centre; and by *inward* is meant the side next to the centre. In reining back, the rider should be careful not to use his legs, unless the horse backeth on his shoulders; in which case they must be both applied gently at the same time, and correspond with the hand. If the horse refuse to back at all, the rider's legs must be gently approached, till the horse lifts up a leg, as if to go forwards; at which time, when that leg is in the

Instructions
concerning
both man
and horse.

Instructions concerning both man and horse.

the air, the rein of the same side with that leg which is lifted up, will easily bring that same leg backwards, and accordingly oblige the horse to back; but if the horse offers to rear, the legs must be instantly removed away. The inward rein must be tighter on circles, so that the horse may bend and look inwards; and the outward one crossed over a little towards it; and both held in the left hand.

Let the man and horse begin on very slow motions, that they may have time to understand and reflect on what is taught them; and in proportion as the effects of the reins are better comprehended, and the manner of working becomes more familiar, the quickness of motion must be increased. Every rider must learn to feel, without the help of the eye, when a horse goes false, and remedy the fault accordingly: this is an intelligence, which nothing but practice, application, and attention, can give, in the beginning on slow motions. A horse may not only gallop false, but also trot and walk false. If a horse gallops false, that is to say, if going to the right he leads with the left leg, or if going to the left he leads with the right; or in case he is disunited, *i. e.* if he leads with the opposite leg behind to that which he leads with before; stop him immediately, and put him off again properly. The method of effecting this, is by approaching your outward leg, and putting your hand outwards; still keeping the inward rein the shorter, and the horse's head inwards, if possible: and if he should still resist, then bend and pull his head outwards also; but replace it again, bent properly inwards, the moment he goes off true. A horse is said to be disunited to the right, when going to the right, and consequently leading with the right leg before, he leads with the left behind; and is said to be disunited to the left, when going to the left, and consequently leading with the left leg before, he leads with the right behind. A horse may at the same time be both false and disunited; in correcting both which faults, the same method must be used. He is both false and disunited to the right, when in going to the right he leads with the left leg before, and the right behind; notwithstanding that hinder leg be with propriety more forward under his belly than the left, because the horse is working to the right: And he is false and disunited to the left, when in going to the left he leads with the right leg before, and the left behind; notwithstanding, as above, that hinder leg be with propriety more forward under his belly than the right, because the horse is working to the left.

In teaching men a right seat on horseback, the greatest attention must be given to prevent stiffness, and sticking by force in any manner upon any occasion: Stiffness disgraces every right work; and sticking serves only to throw a man (when displaced) a great distance from his horse by the spring he must go off with: whereas, by a proper equilibrating position of the body, and by the natural weight only of the thighs, he cannot but be firm and secure in his seat.

As the men become more firm, and the horses more supple, it is proper to make the circles less; but not too much so, for fear of throwing the horses forwards upon their shoulders.

Some horses, when first the bit is put into their mouths, if great care be not taken, will put their heads

very low. With such horses, raise your right hand with the *bridoon* in it, and play at the same time with the bit in the left hand, giving and taking.

On circles, the rider must lean his body inwards; unless great attention be given to make him do it, he will be perpetually losing his seat outwards. It is scarce possible for him to be displaced, if he leans his body properly inwards.

SECT. III. *The method of suppling horses with men upon them, by the ÉPAULE en dedans, &c. with and without a longe, on circles and on straight lines.*

When a horse is well prepared and settled in all his motions, and the rider firm, it will be proper then to proceed on towards a farther suppling and teaching of both.

In setting out upon this new work, begin by bringing the horse's head a little more inwards than before, pulling the inward rein gently to you by degrees. When this is done, try to gain a little on the shoulders, by keeping the inward rein the shorter, as before, and the outward one crossed over towards the inward one. The intention of these operations is this: The inward rein serves to bring in the head, and procures the bend; whilst the outward one, that is a little crossed, tends to make that bend perpendicular, and as it should be, that is to say, to reduce the nose and the forehead to be in a perpendicular line with each other: it also serves, if put forwards, as well as also crossed, to put the horse forwards, if found necessary; which is often requisite, many horses being apt in this and other works rather to lose their ground backwards than otherwise, when they should rather advance: if the nose were drawn in towards the breast beyond the perpendicular, it would confine the motion of the shoulders, and have other bad effects. All other bends, besides what are above specified, are false. The outward rein, being crossed, not in a forward sense, but rather a little backwards, serves also to prevent the outward shoulder from getting too forwards, and makes it approach the inward one; which facilitates the inward leg's crossing over the outward one, which is the motion that so admirably supple the shoulders. Care must be taken, that the inward leg pass over the outward one, without touching it; this inward leg's crossing over must be helped also by the inward rein, which you must cross towards and over the outward rein every time the outward leg comes to the ground, in order to lift and help the inward leg over it: at any other time, but just when the outward leg comes to the ground, it would be wrong to cross the inward rein, or to attempt to lift up the inward leg by it; nay, it would be demanding an absolute impossibility, and lugging about the reins and horse to no purpose: because in this case, a very great part of the horse's weight resting then upon that leg, would render such an attempt not only fruitless, but also prejudicial to the sensibility of the mouth, and probably oblige him to defend himself; and moreover, it would put the horse under a necessity of straddling before, and also of leading with the wrong leg, without being productive of any suppling motion whatsoever.

When the horse is thus far familiarly accustomed to what you have required of him, then proceed to effect by

Of suppling horse.

Directions
for men
and horses.

by degrees the same crossing in his hinder legs. By bringing in the fore-legs more, you will of course engage the hinder ones in the same work: if they resist, the rider must bring both reins more inwards; and, if necessary, put back also, and approach his inward leg to the horse; and if the horse throws out his croup too far, the rider must bring both reins outwards, and, if absolutely necessary, he must also make use of his outward leg, in order to replace the horse properly: observing that the croup should always be considerably behind the shoulders, which in all actions must go first; and, the moment that the horse obeys, the rider must put his hand and leg again in their usual position.

Nothing is more ungraceful in itself, more detrimental to a man's seat, or more destructive of the sensibility of a horse's feet, than a continual wriggling unsettledness in a horseman's legs, which prevents the horse from ever going a moment together true, steady, or determined.

A horse should never be turned, without first moving a step forwards: and when it is doing, the rider must not lift his elbow, and displace himself; a motion only of the hand from the one side to the other being sufficient for that purpose. It must also be a constant rule, never to suffer a horse to be stopped, mounted or dismounted, but when he is well placed. The slower the motions are when a man or horse is taught any thing, the better.

At first, the figures worked upon must be great, and afterwards made less by degrees, according to the improvement which the man and horse make; and the cadenced pace also, which they work in, must be accordingly augmented. The changes from one side to the other, must be in a bold determined trot, and at first quite straight forwards, without demanding any side-motion on two paces, which is very necessary to require afterwards when the horse is sufficiently suppled. By two paces is meant, when the fore-parts and hinder-parts do not follow but describes two different lines.

In the beginning, a *lunge* is useful on circles, and also on straight lines, to help both the rider and the horse; but afterwards, when they are grown more intelligent, they should go alone. At the end of the lesson, rein back; then put the horse, by a little at a time, forwards, by approaching both legs gently to his sides, and playing with the bridle: if he hears, push him out immediately into a full trot. Shaking the *cavesson* on the horse's nose, and also putting one's self before him and rather near to him, will generally make him back, though he otherwise refuse to do it: and moreover a slight use and approaching of the rider's legs, will sometimes be necessary in backing, in order to prevent the horse from doing it too much upon his shoulders; but the pressure of the legs ought to be very small, and taken quite away the moment that he puts himself enough upon his haunches. If the horse does not back upon a straight line properly, the rider must not be permitted to have recourse immediately to his legs, and so distort himself by it; but first try, if crossing over his hand and reins to which ever side may be necessary, will not be alone sufficient; which most frequently it will; if not, then employ the leg.

After a horse is well prepared and settled, and goes freely on in all his several paces, he ought to be in all

his works kept, to a proper degree, upon his haunches, with his hinder legs well placed under him; whereby he will be always pleasant to himself and his rider, will be light in hand, and ready to execute whatever may be demanded of him, with facility, vigour, and quickness.

The common method that is used, of forcing a horse sidewise, is a most glaring absurdity, and very hurtful to the animal in its consequences; for instead of suppling him, it obliges him to stiffen and defend himself, and often makes a creature, that is naturally benevolent, restless, frightened, and vicious.

For horses, who have very long and high fore-hands, and who poke out their noses, a running snaffle is of excellent use; but for such as bore and keep their heads low, a common one is preferable; though any horse's head indeed may be kept up also with a running one, by the rider's keeping his hands very high and forwards: but whenever either is used alone without a bridle upon horses that carry their heads low and that bore, it must be sawed about from one side to the other.

This lesson of the *epaule en dedans*, should be taught to such people as are likely to become useful in helping to teach men and to break horses; and the more of such that can be found, the better: none others should ever be suffered upon any occasion to let their horses look any way besides the way they are going. But all horses whatever, as likewise all men, who are designed for the teaching others, must go thoroughly and perfectly through this excellent lesson, under the directions of intelligent instructors, and often practise it too afterwards; and, when that is done, proceed to and be finished by the lessons of head and tail to the wall.

SECT. IV. Of the head to the wall, and of the croup to the wall.

This lesson should be practised immediately after that of the *epaule en dedans*, in order to place the horse properly the way he goes, &c. The difference between the head to the wall, and the croup to the wall, consists in this: in the former, the fore-parts are more remote from the centre, and go over more ground; in the latter, the hinder-parts are more remote from the centre, and consequently go over more ground: in both, as likewise in all other lessons, the shoulders must go first. In riding-houses, the head to the wall is the easier lesson of the two at first, the line to be worked upon being marked by the wall, not far from his head.

The motion of the legs to the right, is the same as that of the *epaule en dedans* to the left, and so *vice versa*; but the head is always bent and turned differently: in the *epaule en dedans*, the horse looks the contrary way to that which he goes; in this, he looks the way he is going.

In the beginning, very little bend must be required; too much at once would astonish the horse, and make him defend himself: it is to be augmented by degrees. If the horse absolutely refuses to obey, it is a sign that either he or his rider has not been sufficiently prepared by previous lessons. It may happen, that weakness or a hurt in some part of the body, or sometimes temper, though seldom, may be the cause of the horse's defending himself: it is the rider's business to find out

Of head to the wall, &c.

Head to the
wall, &c.

from whence the obstacle arises; and if he finds it to be from the first mentioned cause, the previous lessons must be resumed again for some time; if from the second, proper remedies must be applied; and if from the last cause, when all fair means that can be tried have failed, proper corrections with coolness and judgment must be used.

In practising this lesson to the right, bend the horse to the right with the right rein; helping the left leg over the right (at the time when the right leg is just come to the ground), with the left rein crossed towards the right, and keeping the right shoulder back with the right rein towards your body, in order to facilitate the left leg's crossing over the right; and so likewise *vice versa* to the left, each rein helping the other by their properly mixed effects. In working to the right, the rider's left leg helps the hinder-parts on to the right, and his right leg stops them if they get too forwards; and so *vice versa* to the left: but neither ought to be used, till the hand being employed in a proper manner has failed, or finds that a greater force is necessary to bring about what is required than it can effect alone: for the legs should not only be corresponding with, but also subservient to the hand; and all unnecessary aids, as well as all force, ought always to be avoided as much as possible.

In the execution of all lessons, the equilibrium of the rider's body is of great use to the horse; it ought always to go with and accompany every motion of the animal; when to the right, to the right; and when to the left, to the left.

Upon all horses, in every lesson and action, it must be observed, that there is no horse but has his own peculiar appui or degree of bearing, and also a sensibility of mouth, as likewise a rate of his own, which it is absolutely necessary for the rider to discover and make himself acquainted with. A bad rider always takes off at least the delicacy of both, if not absolutely destroys it. The horse will inform his rider when he has got his proper bearing in the mouth, by playing pleasantly and steadily with his bit, and by the spray about his chaps. A delicate and good hand will not only always preserve a light appui, or bearing, in its sensibility; but also of a heavy one, whether naturally so or acquired, make a light one. The lighter this appui can be made, the better; provided that the rider's hand corresponds with it; if it does not, the more the horse is properly prepared, so much the worse. Instances of this inconvenience of the best of appuis, when the rider is not equally taught with the horse, may be seen every day in some gentlemen, who try to get their horses *bitted* as they call it, without being suitably prepared themselves for riding them: the consequence of which is, that they ride in danger of breaking their necks; till at length, after much hauling about, and by the joint insensibility and ignorance of themselves and their grooms, the poor animals gradually become mere senseless unfeeling pofts; and thereby grow, what they call, *settled*. When the proper appui is found, and made of course as light as possible, it must not be kept duly fixed without any variation, but be played with; otherwise one equally continued tension of reins would render both the rider's hand and the horse's mouth very dull. The slightest and frequent giving and taking, is therefore necessary

to keep both perfect.

Whatever pace or degree of quickness you work in, (be it ever so fast, or ever so slow,) it must be cadenced; time is as necessary for a horseman as for a musician.

This lesson of the head and of the tail to the wall, must be taught every soldier: scarce any manœuvre can be well performed without it. In closing and opening of files, it is almost every moment wanted.

SECT. V. *The method of making horses stand fire, noises, alarms, fights, &c.*

In order to make horses stand fire, the sound of drums, and all sorts of different noises, you must use them to it by degrees in the stable at feeding-time; and instead of being frightened at it, they will soon come to like it as a signal for eating.

With regard to such horses as are afraid of burning objects, begin by keeping them still at a certain distance from some lighted straw: caress the horse; and in proportion as his fright diminishes, approach gradually the burning straw very gently, and increase the size of it. By this means he will very quickly be brought to be so familiar with it, as to walk undaunted even through it.

As to horses that are apt to lie down in the water, if animating them, and attacking them vigorously, should fail of the desired effect, then break a straw-bottle full of water upon their heads, and let the water run into their ears, which is a thing they apprehend very much.

All troop-horses must be taught to stand quiet and still when they are shot off from, to stop the moment you present, and not to move after firing till they are required to do it; this lesson ought especially to be observed in light troops: in short, the horses must be taught to be so cool and undisturbed, as to suffer the rider to act upon him with the same freedom as if he was on foot. Patience, coolness, and temper, are the only means requisite for accomplishing this end. Begin by walking the horse gently, then stop and keep him from stirring for some time, so as to accustom him by degrees not to have the least idea of moving without orders: if he does, then back him; and when you stop him, and he is quite still, leave the reins quite loose.

To use a horse to fire-arms, first put a pistol or a carbine in the manger with his feed; then use him to the sound of the lock and the pan; after which, when you are upon him, shew the piece to him, presenting it forwards, sometimes on one side, sometimes on the other: when he is thus far reconciled, proceed to flash in the pan; after which, put a small charge into the piece, and so continue augmenting it by degrees to the quantity which is commonly used: if he seems uneasy, walk him forward a few steps slowly; and then stop, back, and caress him. Horses are often also disquieted and unsteady at the clasp, and drawing, and returning of swords; all which they must be familiarized to by little and little, by frequency and gentleness.

It is very expedient for all cavalry in general, but particularly for light cavalry, that their horses should be very ready and expert in leaping over ditches, hedges, gates, &c. The leaps, of whatever fort they are, which

To make
horses stand
fire, &c.

the

Of reining
back, &c.

the horses are brought to in the beginning, ought to be very small ones; the riders must keep their bodies back, raise their hands a little in order to help the fore-parts of the horse up, and be very attentive to their equilibre. It is best to begin at a low bar covered with furze, which pricking the horse's legs, if he does not raise himself sufficiently, prevents his contracting a sluggish and dangerous habit of touching, as he goes over, which any thing yielding and not pricking would give him a custom of doing. Let the ditches you first bring horses to be narrow; and in this, as in every thing else, let the increase be made by degrees. Accustom them to come up to every thing which they are to leap over, and to stand coolly at it for some time; and then to raise themselves gently up in order to form to themselves an idea of the distance. When they leap well standing, then use them to walk gently up to the leap, and to go over it without first halting at it; and after that practice is familiar to them, repeat the like in a gentle trot, and so by degrees faster and faster, till at length it is as familiar to them to leap flying on a full gallop as any other way: all which is to be acquired with great facility by calm and soft means, without any hurry.

As horses are naturally apt to be frightened at the sight and smell of dead horses, it is advisable to habituate them to walk over and leap over carcases of dead horses: and as they are particularly terrified at this sight, the greater gentleness ought consequently to be used.

Horses should also be accustomed to swim, which often may be necessary upon service; and if the men and horses both are not used to it, both may be frequently liable to perish in the water. A very small portion of strength is sufficient to guide a horse, anywhere indeed, but particularly in the water, where they must be permitted to have their heads, and be no-ways constrained in any shape.

The unreasonable rage in Britain of cutting off all extremities from horses, is in all cases a very pernicious custom. It is particularly so in regard to a troop-horse's tail. It is almost incredible, how much they suffer at the picket for want of it: constantly fretting, and sweating, kicking about and laming one another, tormented, and stung off their meat, miserable, and helpless; whilst other horses, with their tails on, brush off all flies, are cool and at their ease, and mend daily; whilst the docked ones grow every hour more and more out of condition.

SECT. VI. *The method of reining back,—and of moving forwards immediately after:—of piafing,—of pillars, &c.*

NEVER finish your work by reining back with horses that have any disposition towards retaining themselves; but always move them forwards, and a little upon the haunches also, after it, before you dismount, (unless they retain themselves very much indeed, in which case nothing at all must be demanded from the haunches). This lesson of reining back, and piafing, is excellent to conclude with, and puts an horse well and properly on the haunches: It may be done, according as horses are more or less suppled, either going forwards, backing, or in the same place: if it is done well advancing, or at most on the same spot, it

Of curing
restiveness,
&c

is full sufficient for a soldier's horse: For to piafe in backing, is rather too much to be expected in the hurry which cannot but attend such numbers both of men and horses as must be taught together in regiments. This lesson must never be attempted at all, till horses are very well suppled, and somewhat accustomed to be put together; otherwise it will have very bad consequences, and create restiveness. If they refuse to back, and stand motionless, the rider's legs must be approached with the greatest gentleness to the horse's sides; at the same time that the hand is acting on the reins to solicit the horse's backing. This seldom fails of procuring the desired effect, by raising one of the horse's fore-legs, which being in the air, has no weight upon it, and is consequently very easily brought backwards by a small degree of tension in the reins. When this lesson is well performed, it is very noble and useful, and has a pleasing air; it is an excellent one to begin teaching scholars with.

The lesson is particularly serviceable in the pillars, for placing scholars well at first. Very few regimental riding-houses have pillars, and it is fortunate they have not: for though, when properly made use of with skill, they are one of the greatest and best discoveries in horfmanfhip; they must be allowed to be very dangerous and pernicious, when they are not under the direction of a very knowing person.

SECT. VII. *The method of curing restivenesses, vices, defences, starting, &c.*

WHENEVER a horse makes resistance, one ought, before remedy or correction is thought of, to examine very minutely all the tackle about him, if any thing hurts or tickles him, whether he has any natural or accidental weakness, or in short any the least impediment in any part. For want of this precaution, many fatal disasters happen: the poor dumb animal is frequently accused falsely of being selfish and vitious; is used ill without reason; and, being forced into despair, is in a manner obliged to act accordingly, be his temper and inclination ever so well disposed. It is very seldom the case, that a horse is really and by nature vitious; but if such be found, he will despise all caresses, and then chastisements become necessary.

Correction, according as you use it, throws a horse into more or less violent action, which, if he be weak, he cannot support: but a vitious strong horse is to be considered in a very different light, being able both to undergo and consequently to profit by all lessons; and is far preferable to the best-natured weak one upon earth. Patience and attention are never failing means to reclaim such a horse: in whatsoever manner he defends himself, bring him back frequently with gentleness (not however without having given him proper chastisement if necessary) to the lesson which he seems most averse to. Horses are by degrees made obedient, through the hope of recompense and the fear of punishment: how to mix these two motives judiciously together, is a very difficult matter; it requires much thought and practice; and not only a good head, but a good heart likewise. The coolest and best-natured rider will always succeed best. By a dexterous use of the incitements above mentioned, you will gradually bring the horse to temper and obedience; mere force, and want of skill and coolness,

Of tearing,
flirting,
&c.

would only tend to confirm him in bad tricks. If he be impatient or choleric, never strike him, unless he absolutely refuse to go forwards; which you must resolutely oblige him to do, and which will be of itself a correction, by preventing his having time to meditate and put in execution any defence by retaining himself. Resistance in horses, you must consider, is sometimes a mark of strength and vigour, and proceeds from spirits, as well as sometimes from vice and weakness. Weakness frequently drives horses into viciousness, when any thing wherein strength is necessary is demanded from them; nay, it inevitably must: great care therefore should always be taken to distinguish from which of these two causes any remedy or punishment is thought of. It may sometimes be a bad sign when horses do not at all defend themselves, and proceed from a sluggish disposition, a want of spirit and of a proper sensibility. Whenever one is so fortunate as to meet with a horse of just the right spirit, activity, delicacy of feeling, with strength and good-nature, he cannot be cherished too much; for such a one is a rare and inestimable jewel, and, if properly treated, will in a manner do every thing of himself. Horses are oftener spoiled by having too much done to them, and by attempts to dress them in too great an hurry, than by any other treatment.

If after a horse has been well fuppled, and there are no impediments, either natural or accidental, if he still persists to defend himself, chastisements then become necessary: but whenever this is the case, they must not be frequent, but always firm, though always as little violent as possible; for they are both dangerous and very prejudicial when frequently or slightly played with, and still more so when used too violently.

It is impossible, in general, to be too circumspect in lessons of all kinds, in aids, chastisements, or caresses. Some have quicker parts, and more cunning, than others. Many will imperceptibly gain a little every day on their rider. Various, in short, are their dispositions and capacities. It is the rider's business to find out their different qualities, and to make them sensible how much he loves them, and desires to be loved by them; but at the same time that he does not fear them, and will be master.

Plunging is a very common defence among restive and vicious horses: if they do it in the same place, or backing, they must, by the rider's legs and spurs firmly applied, be obliged to go forwards, and their heads kept up high. But if they do it flying forwards, keep them back, and ride them gently and very slow for a good while together. Of all bad tempers and qualities in horses, those which are occasioned by harsh treatment and ignorant riders are the worst.

Rearing is a bad vice, and, in weak horses especially, a very dangerous one. Whilst the horse is up, the rider must yield his hand; and when the horse is descending, he must vigorously determine him forwards: if this be done at any other time but whilst the horse is coming down, it may add a spring to his rearing, and make him fall backwards. With a good hand on them, horses seldom persist in this vice; for they are themselves naturally much afraid of falling backwards. If this method fails, you must make the horse kick up behind, by getting somebody on foot

to strike him behind with a whip; or, if that will not effect it, by pricking him with a goad.

Starting often proceeds from a defect in the sight; which therefore must be carefully looked into. Whatever the horse is afraid of, bring him up to it gently; if you carels him every step he advances, he will go quite up to it by degrees, and soon grow familiar with all sorts of objects. Nothing but great gentleness can correct this fault; for if you inflict punishment, the apprehension of chastisement becomes prevalent, and causes more starting than the fear of the object. If you let him go by the object, without bringing him up to it, you increase the fault, and confirm him in his fear: the consequence of which is, he takes his rider perhaps a quite contrary way from what he was going, becomes his master, and puts himself and the person upon him every moment in great danger.

With such horses as are to a very great degree fearful of any objects, make a quiet horse, by going before them, gradually entice them to approach nearer and nearer to the thing they are afraid of. If the horse, thus alarmed, be undisciplined and headstrong, he will probably run away with his rider; and if so, his head must be kept up high, and the snaffle sawed backwards and forwards from right to left, taking up and yielding the reins of it, as also the reins of the bit: but this latter must not be sawed backwards and forwards like the snaffle, but only taken up and yielded properly. No man ever yet did, or ever will, stop a horse, or gain any one point over him, by main force, or by pulling a dead weight against him.

SECT. VIII. Rules for Bad Horsemen.

In the first place, every horse should be accustom'd to stand still when he is mounted. One would imagine this might be readily granted; yet we see how much the contrary is practised. When a gentleman mounts at a livery-stable, the groom takes the horse by the bit, which he bends tight round his under-jaw: the horse striving to go on, is forced back; advancing again, he frets, as he is again stopped short, and hurt by the manner of holding him. The rider, in the mean time, mounting without the bridle, or at least holding it but slightly, is helped to it by the groom, who being thoroughly employed by the horse's flustering, has at the same time both bridle and stirrup to give. This confusion would be prevented, if every horse was taught to stand still when he is mounted.

Forbid your groom therefore, when he rides your horse to water, to throw himself over him from a horse-block, and kick him with his leg, even before he is fairly upon him. This wrong manner of mounting, is what chiefly teaches your horse the vicious habit against which we are here warning. On the other hand, a constant practice of mounting in the proper manner, is all that is necessary to prevent a horse's going on till the rider is quite adjusted in the saddle.

The next thing necessary therefore is, that the rider should mount properly. The common method is to stand near the croup, or hinder part of the horse, with the bridle held very long in the right hand. By this manner of holding the bridle before you mount, you are liable to be kicked; and when you are mounted, your horse may go on some time, or play what gambols

Plain rule
for bad
horsemen

Thomson's
Rules.

tain rules
for bad
horfemen.

Plain rules
for bad
horfemen.

holds the reins, before the rein is short enough in your hand to prevent him. It is common likewise, for an awkward rider, as soon as his foot is in the stirrup, to throw himself with all his force, to gain his seat; which he cannot do, till he hath first overbalanced himself on one side or the other: he will then wriggle into it by degrees. The way to mount with ease and safety is, to stand rather before than behind the stirrup. In this posture take the bridle short, and the mane together in your left hand, helping yourself to the stirrup with your right, so that your toe may not touch the horse in mounting. When your left foot is in the stirrup, move on your right, till you face the side of the horse, looking across over the saddle. Then with your right hand grasp the hinder part of the saddles; and with that and your left, which holds the mane and bridle, lift yourself upright on your left foot. Remain thus a mere instant on your stirrup, only so as to divide the action into two motions. While you are in this posture, you have a sure hold with both hands, and are at liberty, either to get safely down, or to throw your leg over and gain your seat. By this deliberate motion, likewise, you avoid, what every good horfeman would endeavour to avoid, putting your horse into a flutter.

When you dismount, hold the bridle and mane together in your left hand, as when you mounted; put your right hand on the pommel of the saddle, to raise yourself; throw your leg back over the horse, grasp the hinder part of the saddle with your right hand, remain a moment on your stirrup, and in every respect dismount as you mounted; only what was your first motion when you mounted, becomes the last in dismounting. Remember not to bend your right knee in dismounting, lest your spur should rub against the horse.

It may be next recommended to hold your bridle at a convenient length. Sit square, and let not the purchase of the bridle pull forward your shoulder; but keep your body *even*, as it would be if each hand held a rein. Hold your reins with the whole grasp of your hand, dividing them with your little finger. Let your hand be perpendicular; your thumb will then be uppermost, and placed on the bridle. Bend your wrist a little outward; and when you pull the bridle, raise your hand toward your breast, and the lower part of the palm rather more than the upper. Let the bridle be at such a length in your hand, as, if the horse should stumble, you may be able to raise his head, and support it by the strength of your arms, and the weight of your body thrown backward. If you hold the rein too long, you are subject to fall backward, as your horse rises.

If, knowing your horse perfectly well, you think a tight rein unnecessary, advance your arm a little (but not your shoulder) towards the horse's head, and keep your usual length of rein. By this means, you have a check upon your horse, while you indulge him.

If you ride with a curb, make it a rule to hook on the chain yourself; the most quiet horse may bring his rider into danger, should the curb hurt him. If, in fixing the curb, you turn the chain to the right, the links will unfold themselves, and then oppose a farther turning. Put on the chain loose enough to hang down on the horse's under lip, so that it may not

rise and press his jaw, till the reins of the bridle are moderately pulled.

If your horse has been used to stand still when he is mounted, there will be no occasion for a groom to hold him; but if he does, suffer him not to touch the reins, but that part of the bridle which comes down the cheek of the horse. He cannot then interfere with the management of the reins, which belongs to the rider only; and holding a horse by the curb (which is ever painful to him) is evidently improper when he is to stand still.

Another thing to be remembered is, not to ride with your arms and elbows as high as your shoulders; nor let them shake up and down with the motion of the horse. The posture is unbecoming, and the weight of the arms (and of the body too if the rider does not sit still) acts in continual jerks on the jaw of the horse, which must give him pain, and make him unquiet, if he has a tender mouth, or any spirit.

Bad riders wonder why horses are gentle as soon as they are mounted by skilful ones, tho' their skill seems unemployed: the reason is, the horse goes at his ease, yet finds all his motions watched; which he has sagacity enough to discover. Such a rider hides his whip, if he finds his horse is afraid of it; and keeps his legs from his sides, if he finds he dreads the spur.

Avoid the ungraceful custom of letting your legs shake against the sides of the horse; and as you are not to keep your arms and elbows high, and in motion; so you are not to rivet them to your sides, but let them fall easy. One may, at a distance, distinguish a genteel horfeman from an awkward one: the first sits still, and appears of a piece with his horse; the latter seems flying off at all points.

It is often said with emphasis, that such a one has no seat on horseback; and it means, not only that he does not ride well, but that he does not sit on the right part of the horse. To have a *good seat*, is to sit on that part of the horse, which, as he springs, is the centre of motion; and from which, of course, any weight would be with most difficulty shaken. As in the rising and falling of a board placed in *equilibrium*, the centre will be always most at rest; the true seat will be found in that part of your saddle, into which your body would naturally slide, if you rode without stirrups; and is only to be preserved by a proper poise of the body, though the generality of riders imagine it is to be done by the grasp of the thighs and knees. The rider should consider himself as united to his horse in this point; and when shaken from it, endeavour to restore the balance.

Perhaps the mention of the two extremes of a bad seat may help to describe the true one. The one is, when the rider sits very far back on the saddle, so that his weight presses the loins of the horse; the other, when his body hangs forward over the pommel of the saddle. The first may be seen practised by grooms, when they ride with their stirrups affectedly short; the latter, by fearful horfemen on the least flutter of the horse. Every *good rider* has, even on the hunting saddle, as determined a place for his thighs, as can be determined for him by the bias of a demi-peak. Indeed there is no difference between the seat of either: only, as in the first you ride with shorter stirrups, your body will be consequently more behind your knees.

Plain rules
for bad
horsemen.

To have a good seat yourself, your saddle must fit well. To fix a precise rule might be difficult: it may be a *direction*, to have your saddle press as nearly as possible on that part which we have described as the point of union between the man and horse; however, so as not to obstruct the motion of the horse's shoulders. Place yourself in the middle or lowest part of it: sit erect; but with as little constraint as in your ordinary sitting. The ease of action marks the gentleman: you may repose yourself, but not lounge. The set and studied erectness acquired in the riding-house, by those whose department is not easy, appears ungenteel and unnatural.

If your horse stops short, or endeavours by rising and kicking to unseat you, bend not your body forward, as many do in those circumstances: that motion throws the breech backward, and you off your fork or twist, and out of your seat; whereas, the advancing the lower part of your body, and bending back the upper part and shoulders, is the method both to keep your seat, and to recover it when lost. The bending your body back, and that in a great degree, is the greatest security in *flying* leaps; it is a security too, when your horse leaps *standing*. The horse's rising does not try the rider's seat; the laxity of his hind legs is what ought chiefly to be guarded against, and is best done by the body's being greatly inclined back. Stiffen not your legs or thighs; and let your body be pliable in the loins, like the coachman's on his box. This loose manner of sitting will elude every rough motion of the horse; whereas the fixture of the knees, so commonly laid a stress on, will in great shocks conduce to the violence of the fall.

Was the cricket-player, when the ball is struck with the greatest velocity, to hold his hand firm and fixed when he receives it, the hand would be bruised, or perhaps the bones fractured by the resistance. To obviate this accident, he therefore gradually yields his hand to the motion of the ball for a certain distance; and thus by a due mixture of opposition and obedience, catches it without sustaining the least injury. The case is exactly the same in riding: the skilful horseman will recover his poise, by giving some way to the motion; and the ignorant horseman will be flung out of his seat, by endeavouring to be fixed.

Stretch not out your legs before you; this will push you against the back of the saddle: neither gather up your knees, like a man riding on a pack; this throws your thighs upwards: each practice unseats you. Keep your legs straight down; and sit not on the most fleshy part of the thighs, but turn them inwards, so as to bring in your knees and toes: and it is more safe to ride with the ball of the foot pressing on the stirrup, than with the stirrup as far back as the heel; for the pressure of the heel being in that case behind the stirrup, keeps the thighs down.

When you find your thighs thrown upwards, widen your knees to get them and the upper part of your fork lower down on the horse. Grasp the saddle with the hollow or inner part of your thighs, but not more than just to assist the balance of your body: this will also enable you to keep your spurs from the horse's sides, and to bring your toes in, without that affected and useless manner of bringing them in practised by many. Sink your heels straight down; for while your

heels and thighs keep down, you cannot fall: this (aided with the bend of the back) gives the security of a seat, to those who bear themselves up in their stirrups in a swift gallop, or in the alternate rising and falling in a full trot.

Let your seat determine the length of your stirrups, rather than the stirrups your seat. If more precision is requisite, let your stirrups (in the hunting saddle) be of such a length, as that, when you stand in them, there may be the breadth of four fingers between your seat and the saddle.

It would greatly assist a learner, if he would practice riding in a large circle, as directed sect. ii. without stirrups; keeping his face looking on the outward part of the circle so as not to have a full view of the horse's head, but just of that ear which is on the outward part of the circle; and his shoulder, which is towards the centre of the circle, very forward. By this means you learn to balance your body, and keep a true seat, independent of your stirrups: you may probably likewise escape a fall, should you at any time lose them by being accidentally shaken from your seat.

As the seat in some measure depends on the saddle, it may not be amiss to observe, that because a saddle with a high pommel is thought dangerous, the other extreme prevails, and the pommel is scarce allowed to be higher than the middle of the saddle. The saddle should lie as near the back-bone as can be, without hurting the horse; for the nearer you sit to his back, the better seat you have. If it does so, it is plain the pommel must rise enough to secure the withers from pressure: therefore, a horse whose withers are higher than common, requires a higher pommel. If, to avoid this, you make the saddle of a more straight line, the inconvenience (spoken of follows); you sit too much above the horse's back, nor can the saddle form a proper seat. There should be no ridge from the button at the side of the pommel, to the back part of the saddle. That line also should be a little concave, for your thighs to lie at ease. In short, a saddle ought to be, as nearly as possible, as if cut out of the horse.

When you want your horse to move forward, raise his head a little, and touch him gently with your whip; or else, press the calves of your legs against his sides. If he does not move fast enough, press them with more force, and so till the spur just touches him. By this practice, he will (if he has any spirit) move upon the last pressure of the leg. Never spur him by a kick; but if it be necessary to spur him briskly, keep your heels close to his sides, and slacken their force as he becomes obedient.

When your horse attempts to be vicious, take each rein separate, one in each hand, and advancing your arms forward, hold him very short. In this case, it is common for the rider to pull him hard, with his arms low. But the horse by this means having his head low too, has it more in his power to throw out his heels: whereas, if his head be raised very high, and his nose thrown out a little, which is consequent, he can neither rise before nor behind; because he can give himself neither of those motions, without having his head at liberty. A plank placed in *equilibrio*, cannot rise at one end unless it sinks at the other.

If your horse is headstrong, pull not with one con-

Plain r.
for bad
horsemen.

tinued pull, but stop, and back him often, just shaking the reins, and making little repeated pulls till he obeys. Horses are so accustomed to bear on the bit when they go forward, that they are discouraged if the rider will not let them do so.

If a horse is loose-necked, he will throw up his head at a continued pull; in which situation, the rider, seeing the front of his face, can have no power over him. When your horse does thus, drop your hand and give the bridle play, and he will of course drop his head again into its proper place: while it is coming down, make a second gentle pull, and you will find his mouth. With a little practice, this is done almost instantaneously; and this method will stop, in the distance of a few yards, a horse, which will run away with those who pull at him with all their might. Almost every one must have observed, that when a horse feels himself pulled with the bridle, even when he is going gently, he often mistakes what was designed to stop him, as a direction to bear on the bit and to go faster.

Keep your horse's head high, that he may raise his neck and crest; play a little with the rein, and move the bit in his mouth, that he may not press on it in one constant and continued manner: be not afraid of raising his head too high; he will naturally be too ready to bring it down, and tire your arms with its weight, on the least abatement of his mettle. When you feel him heavy, stop him, and make him go back a few paces: thus you break by degrees his propensity to press on his bridle.

You ought not to be pleased (though many are) with a round neck, and a head drawn in towards his breast: let your horse carry his head bridling in, provided he carries it high, and his neck arching upwards; but if his neck bends downwards, his figure is bad, his fight is too near his toes, he leans on the bridle, and you have no command over him. If he goes prestling but lightly on the bridle, he is the more sure-footed, and goes pleasanter; as your writ only may guide him. If he hangs down his head, and makes you support the weight of that and his neck with your arms bearing on his fore-legs, (which is called *being on his shoulders*), he will strike his toes against the ground, and stumble.

If your horse is heavy upon the bit, tie him every day, for an hour or two, with his tail to the manger, and his head as high as you can make him lift it, by a rein on each post of the stall, tied to each ring of the snaffle bit.

Horse-breakers and grooms have a great propensity to bring a horse's head down, and seem to have no feat without a strong hold by the bridle. They know indeed, that the head should yield to the reins, and the neck form an arch; but do not take the proper pains to make it an arch upward. A temporary effect of attempting to raise a horse's head, may perhaps be making him push out his nose. They will here tell you, that his head is too high already; whereas it is not the distance from his nose, but from the top of his head, to the ground, which determines the head to be high or low. Besides, although the fault is said to be in the manner of carrying the head, it should rather be said to be in that of the neck; for if the neck was raised, the head would be more in the position of one

set on a well formed neck.

The design therefore of lifting up the head, is to raise the neck, and thereby bring in the head; for even while the bridle makes the same line from the rider's hand to the bit, the horse's nose may be either drawn in, or thrust out, according as his neck is raised or depressed. Instead of what has been here recommended, we usually see colts broke with their heads caved down very low, their necks stiff, and not in the least suppled. When the breaking-tackle is left off, and they are mounted for the road, having more food and rest, they frequently plunge, and a second breaking becomes necessary. Then, as few gentlemen can manage their own horses, they are put into the hands of grooms, from whom they learn a variety of bad habits.

If, on the other hand, your horse carries his head (or rather his nose) too high, he generally makes some amends by moving his shoulders lightly, and going safely. Attend to the cause of this fault. Some horses have their necks set so low on their shoulders, that they bend first down, then upwards, like a flag's. Some have the upper line of their necks, from their ears to their withers, too short. A head of this sort cannot possibly bend inwards and form an arch, because the vertebrae (or neck bones) are too short to admit of flexure; for in long and short necked horses the number of the vertebrae is the same. In some, the jaw is so thick, that it meets the neck, and the head by this means has not room to bend. On the other hand, some have the under line from the jaw to the breast, so short, that the neck cannot rise.

In all these cases you may gain a little by a nice hand with an easy bit; but no curb, martingale, or other forcible method, will teach a horse to carry his head or neck in a posture which nature has made uneasy to him. By trying to pull in his nose farther than he can bear, you will add a bad habit to nature. You could not indeed contrive a more effectual method to make him continually toss his nose up, and throw his foam over you.

The rule already given to ride a loose-necked horse, will be a proper one for all light-mouthed horses: one caution being added, which is, always to search whether his saddle or girths may not in some way pinch him; and whether the bit may not hurt his lip by being too high in his mouth: because, whenever he frets from either of these causes, his head will not be steady.

It is a common custom to be always pulling at the bridle, as if to set off to advantage either the spirit of the horse, or the skill of the rider. Our horses therefore are taught to hold their heads low, and pull so, as to bear up the rider from the saddle, standing in his stirrups, even in the gentlest gallop: how very improper is this, we are experimentally convinced, when we happen to meet with a horse which gallops otherwise. We immediately say, *he canters excellently*, and find the ease and pleasure of his motion. When horses are designed for the race, and swiftness is the only thing considered, the method may be a good one.

It is not to be wondered that *dealers* are always pulling at their horses; that they have the spur constantly in their sides, and are at the same time continually checking the rein: by this means they make them bound, and champ the bit, while their rage has the

Plain rules
for bad
horsemen.

the appearance of spirit. These people ride with their arms spread, and very low on the shoulders of their horses: this method makes them stretch their necks, and gives a better appearance to their fore-hands; it conceals also a thick jaw, which, if the head was up, would prevent its yielding to the bit; it hides likewise the ewe-neck, which would otherwise shew itself. Indeed, if you have a horse unsteady to the bit, formed with a natural heavy head, or one which carries his nose obstinately in the air, you must find his mouth where you can, and make the best of him.

Many horses are taught to start by whipping them for starting. How is it possible they can know it is designed as a punishment? In the riding-house, you teach your horse to rise up before, and to spring and lash out his hinder legs, by whipping him when tied between two pillars, with his head a little at liberty. If he understood this to be a punishment for doing so, he would not by that method learn to do it. He seems to be in the same manner taught to spring and fly when he is frightened. Most horses would go quietly past an object they were beginning to fly from, if their riders, instead of gathering up their bridles, and shewing themselves so ready, should throw the reins loose upon their necks.

When a horse starts at any thing on one side, most riders turn him out of the road, to make him go up to what he starts at: if he does not get the better of his fear, or readily comply, he generally goes past the object, making with his hinder parts, or croup, a great circle out of the road; whereas, he should learn to keep straight on, without minding objects on either side.

If he starts at any thing on the left, hold his head high, and keep it straight in the road, pulling it from looking at the thing he starts at, and keeping your right leg hard pressed against his side, towards his flank: he will then go straight along the road. By this method, and by turning his head a little more, he may be forced with his croup close up to what frightened him; for as his head is pulled one way, his croup necessarily turns the other. Always avoid a quarrel with your horse, if you can: if he is apt to start, you will find occasions enough to exercise his obedience, when what he starts at lies directly in his way, and you *must* make him pass; if he is not subject to start, you should not contend with him about a trifle.

It must be observed, however, that this rule in going past an object may perhaps be a little irregular in a managed horse, which will always obey the leg: but even such a horse, if he is really afraid, and not restive, it may not be amiss to make look another way; unless the object be something you would particularly accustom him to the sight of.

The case will also be different with a horse whose fear is owing to his being not used to objects; but such a one is not to be rode by any horseman to whom these rules are directed: the starting here meant arises merely from the horse's being pamper'd, and springing through liveliness.

The notion of the necessity of making a horse go immediately up to every thing he is afraid of, and not suffering him to become master of his rider, seems to be in general carried too far. It is an approved and good method to conquer a horse's fear of the sound of

a drum, by beating one near to him at the time of feeding him: this not only familiarizes the noise to him, but makes it pleasant, as a fore-runner of his meat*; whereas, if he was whipped up to it, he might perhaps start at it as long as he lived. Might not this be applied to his starting at other things, and shew that it would be better to suffer him (provided he does not turn back) to go a little from, and avoid an object he has a dislike to, and to accustom him to it by degrees, convincing him, as it were, that it will not hurt him; than to punish him, quarrel with him, and perhaps submit to his will at last, while you insist on his overcoming his fear in an instant? If he sees a like object again, it is probable he will recollect his dread, and arm himself to be disobedient.

We are apt to suppose, that a horse fears nothing so much as his rider: but may he not, in many circumstances, be afraid of instant destruction? of being crushed? of being drowned? of falling down a precipice? Is it a wonder that a horse should be afraid of a loaded waggon? may not the hanging load seem to threaten the falling on him? There cannot be a rule more general, than, in such a case, to shew him there is room for him to pass. This is done by turning his head a very little from the carriage, and pressing your leg, which is farthest from it, against his side.

A horse is not to stop without a sign from his rider. —Is it not then probable, that when he is driven up to a carriage he starts at, he conceives himself obliged either to attack or run against it? Can he understand the rider's spurring him with his face directed to it, as a sign for him to pass it? That a horse is easily alarmed for his face and eyes, (he will even catch back his head from a hand going to caress him); that he will not go with any force, face to face, even to another horse, (if in his power to stop); and that he sees perfectly sideways,—may be useful hints for the treatment of horses, with regard to starting.

Though you ought not to whip a horse for starting, there can be no good effect from clapping his neck with your hand to encourage him. If one took any notice of his starting, it should be rather with some tone of voice which he usually understood as an expression of dislike to what he is doing; for there is *opposition* mixed with his starting, and a horse will ever repeat what he finds has foiled his rider.

Notwithstanding the direction above given, of not pressing a horse up to a carriage he starts at; yet if one which you apprehend will frighten him meets you at a narrow part of the road, when you have once let him know he is to pass it, be sure you remain determined, and press him on. Do this more especially when part of the carriage has already passed you: for if, when he is frightened, he is accustomed to go back, and turn round, he will certainly do it if he finds, by your hand slackening, and legs not pressing, that you are irresolute; and this at the most dangerous point of time, when the wheels of the carriage take him as he turns. Remember not to touch the curb-rein at this time; it will certainly check him. It is not known to every one, that the person who would lead a horse by the bridle, should not turn his face to him when he refuses to follow him: if, besides this, he raises his arms, shews his whip, or pulls the bridle with jerks, he frightens the horse, instead of persuading

Plain
for the
horsem.

* See
Sect. v.

Plain rules riding him to follow; which a little patience may bring about.

for bad horfemen.

Ride with a snaffle; and use your curb, if you have one, only occasionally. Choose your snaffle full and thick in the mouth, especially at the ends to which the reins are fastened. Most of them are made too small and long; they cut the horse's mouth, and bend back over the bars of his jaw, working like pincers.

The management of the curb is too nice a matter to enter on here, farther than to prescribe great caution in the use of it: a turn of the wrist, rather than the weight of your arm, should be applied to it. The elasticity of a rod, when it hath hooked a fish, may give you some idea of the proper play of a horse's head on his bridle; his spirit and his pliancy are both marked by it.

A horse should never be put to do any thing in a curb, which he is not ready at: you may force him, or pull his head any way, with a snaffle; but a curb acts only in a straight line. It is true, that a horse will be turned out of one track into another by a curb, but it is because he knows it as a *signal*. When he is put to draw a chair, and does not understand the necessity he is then under of taking a larger sweep when he turns, you frequently see him *refuse*, as it is then called: but put him on a snaffle, or buckle the rein to that part of the bit which does not curb him; and the horse submits to be pulled about, till he understands what is desired of him. These directions suppose your horse to have spirit, and a good mouth: if he has not, you must take him as he is, and ride him with such a bit as you find most easy to yourself.

When you ride a journey, be not so attentive to your horse's nice carriage of himself, as to your encouragement of him, and keeping him in good-humour. Raise his head; but if he flags, you may indulge him with bearing a little more upon the bit than you would suffer in an airing. If a horse is lame, tender-footed, or tired, he naturally hangs upon his bridle. On a journey, therefore, his mouth will depend greatly on his strength and the goodness of his feet. Be then very careful about his feet, and let not a farrier spoil them. You will be enabled to keep them from danger, by the directions given under the article *SHOEING*.

Very few, although practised in riding, know they have any power over a horse, but by the bridle; or any use for the spur, except to make him go forward. A little experience will teach them a farther use. If the left spur touches him (and he is at the same time prevented from going forward), he has a sign, which he will soon understand, to move sideways to the right. In the same manner to the left, if the right spur is clofed to him: he afterwards, through fear of the spur, obeys a touch of the leg; in the same manner as a horse moves his croup from one side of the stall to the other, when any one strikes him with his hand. In short, his croup is guided by the leg, as his head is by the bridle. He will never disobey the leg, unless he becomes reltive. By this means you will have a far greater power over him: he will move sideways, if you close one leg to him; and straight forward, if both: even when he stands still, your legs hold near

Vol. V.

him will keep him on the watch; and with the slightest, unseen motion of the bridle upwards, he will raise his head, and shew his forehead to advantage.

On this use of the legs of the rider, and guidance of the croup of the horse, are founded all the *airs* (as the riding-masters express themselves) which are taught in the manage; the passage, or side-motion of troopers to close or open their files, and indeed all their evolutions. But the convenience of some degree of this discipline for common use, is the reason of mentioning it here. It is useful if a horse is apt to stumble or start. If to the first, by pressing your legs to his flank, and keeping up his head, he is made to go light on his fore-legs, which is aiding and supporting him; and the same if he does actually stumble, by helping him at the very instant to exert himself, while as yet any part of him remains not irrecoverably impressed with the precipitate motion. Hence this use of the hand and legs of the rider is called *giving aids* to a horse; for, as to holding up the weight of a heavy unactive horse, by mere pulling, it is as impossible as to recover him when falling down a precipice.

A horse is supported and helped by the hands and legs of his rider, in every action they require of him; hence he is said to perform his *airs*: by the *aids* from his rider.

The same manner is useful if a horse starts. For if when he is beginning to fly to one side, your leg on the side he is flying to, he stops his spring immediately. He goes past what he started at, keeping straight on, or as you choose to direct him; and he will not fly back from any thing, if you press him with both legs. You keep his haunches under him, going down a hill; help him on the side of a bank; more easily avoid the wheel of a carriage; and approach more gracefully and nearer to the side of a coach, or horseman. When a pampered horse curvets irregularly, and twists his body to and fro, turn his head either to the right or left, or both alternately, (but without letting him move out of the track), and press your leg to the opposite side: your horse cannot then spring on his hind-legs to one side, because your leg prevents him; nor to the other, because his head looks that way, and a horse does not start and spring to the side on which he looks. Here it may not be amiss to observe the impropriety of the habit which many riders have, of letting their legs shake against the sides of the horse: if a horse is taught, they are then continually pressing him to violent action; and if he is not, they render him insensible and incapable of being taught. The fretting of a hot horse will hence be excessive, as it can no otherwise be moderated, than by the utmost skillness of the seat, hands, and legs of the rider.

Colts at first are taught to *bear* a bit, and by degrees to *pull* at it. If they did not press it, they could not be guided by it. By degrees they find their necks stronger than the arms of a man; and that they are capable of making great opposition, and often of foiling their riders. Then is the time to make them supple and pliant in every part. The part which of all others requires most this pliancy, is the neck. Hence the metaphor of *stiff-necked* for *disobedient*. A

21 H

horfe

Plain rules for bad horfemen.

horse cannot move his head, but with the muscles of his neck: this may be called his *helm*; it guides his course, changes and directs his motion.

The use of this pliancy in the different parts and limbs of a horse has been already shewn in a former section. The present section being directed to the *unexperienced* horseman, it may suffice to add, that

his idea of suppleness need only be, that of an ability and readiness in a horse to move every limb, on a sign given him by the hands or legs of his rider; as also, to bend his body, and move in a short compass, quick and collected within himself, so as instantly to be able to perform any other motion.

H O R

Horsham
|| Hortus.

HORSHAM, a town of Suffex in England, seated near St Leonard's forest, sending two members to parliament. W. Long. o. 22. N. Lat. 51. 10.

HORSTIUS (James), professor of medicine in the university of Helmstadt, in the 16th century. He joined devotion with the knowledge and practice of physic. He carefully prayed to God to bless his prescriptions, and published a form of prayer upon this subject. He also wrote, 1. A treatise on the qualities of a good physician. 2. Another on the qualities of a good apothecary. 3. A treatise of the plague, in German. 4. A commentary in *libros Hippocratis de corde*, and other works.

HORSTIUS (Gregory), nephew of the former, called the *Æsculapius of Germany*, published several books, which are esteemed.

HORTAGILERS, in the grand signior's court, upholsters, or tapestry-hangers. The grand signior has constantly 400 in his retinue when he is in the camp: these go always a day's journey before him, to fix upon a proper place for his tent, which they prepare first; and afterwards those of the officers, according to their rank.

HORTENSIVS (Quintus), a celebrated Roman orator, the cotemporary of Cicero, pleaded with universal applause at 19 years of age, and continued the same profession during 48 years. But being at last eclipsed by Cicero, he quitted the bar, and embraced a military life; became a military tribune, prætor, and afterwards consul, about 70 B. C. Cicero speaks of him in such a manner as makes us regret the loss of his orations. Hortensius had a wonderful memory, and delivered his orations without writing down a single word, or forgetting one particular that had been advanced by his adversaries. He died very rich, a little before the civil war, which he had endeavoured by all possible means to prevent.

HORTUS SICCUS, A DRY GARDEN; an appellation given to a collection of specimens of plants, carefully dried and preserved.

Take a specimen of a plant in flower, and with it one of its bottom-leaves, if it have any; bruise the stalk, if too rigid; slit it, if too thick; spread out the leaves and flowers on paper; cover the whole with more paper, and lay a weight over all. At the end of 18 hours take out the plants, now perfectly flatted; lay them on a bed of dry common sand; sift over them more dry sand, to the depth of two inches, and thus let them lie about three weeks: the less succulent dry much sooner, but they take no harm afterwards. If the floor of a garret be covered in spring with sand two inches deep, leaving space for walking to the several parts, it will receive the collection of a whole summer, the covering of sand being sifted over every parcel as laid in. They need no farther care, from the time of laying them, till they are taken up to be

H O R

stuck on paper. The cement used is a solution of gum-arabic in water.

Plants may be dried very well without sand, by only putting them frequently into fresh quires of paper, or a few by only pressing them between the leaves of a book; but the sand-method preserves the colour best, and is done with least trouble.

HOSANNA, a Hebrew word, signifying *save now*, or *save, we beseech thee*; from the frequent use of which, during the feast of tabernacles, the whole solemnity got the appellation of *Hosanna Rabbi*.

HOSE, from the Saxon *Hofa*, a flocking. See STOCKING.

HOSEA, a canonical book of the Old Testament, so called from the prophet of that name, its author, who was the son of Beri, and the first of the lesser prophets. He lived in the kingdom of Samaria, and delivered his prophecies under the reign of Jeroboam II. and his successors, kings of Israel; and under the reigns of Uzziah, Jotham, Ahaz, and Hezekiah, kings of Judah. His principal design is to publish the gross idolatries of the people of Israel and Judah, to denounce the divine vengeance against them, and to foretell the captivity in Assyria.

In the beginning of Hosea's prophecy, we read that the Lord directed him to take unto him a wife of whoredoms, and children of whoredoms; that is, to marry a woman of a bad life. This was designed as a figurative description of the idolatry and infidelity of Samaria and the ten tribes, formerly the Lord's spouse, but afterwards become adulterous and corrupt. Many interpreters, shocked at the irregularity of this marriage of the prophet, fancy that it only passed in vision; whilst others think, that the marriage was real, though figurative of the things it described, and which were afterwards to be performed.

HOSPINIAN (Rodolphus), one of the greatest writers that Switzerland has given birth to. He was born in 1547, at Aorf near Zurich; obtained the freedom of Zurich; and was made provisor of the abbey school. Notwithstanding this employment, he undertook a noble work of vast extent, which was a *History of the Errors of Popery*. Though he could not complete this work according to his plan, he published some considerable parts of it: what he published on the Eucharist, and another work called *Concordia Discors*, exceedingly exasperated the Lutherans. He did not reply to them; but turning his arms against the Jesuits, published *Historia Jesuitica*, &c. These writings gained him preferment; he being appointed archdeacon of Caroline church, and then minister of the abbey-church. He died in 1626; and there was an edition of his works published at Geneva 1681, in seven volumes in folio.

HOSPITAL

Hofan
|| Hofpint

Hospital.

HOSPITAL (Michael de l'), chancellor of France in the 16th century, was one of the greatest men of his age, and had raised himself by degrees. He agreed to an edict much feverer against the Protestants than he could have wished, to prevent the introduction of the inquisition. It was that of Romorantin. The speeches he made, in order to inspire a spirit of toleration, made him much suspected by the Roman Catholics, and extremely odious to the court of Rome. The maxims of state, upon which he regulated himself, were of great advantage to France, since he formed some disciples who opposed, in proper time, the pernicious attempts of the leaguers, and rendered them abortive.—His pacific views being disliked by Catharine de Medicis, who had contributed to his advancement, he excluded him from the council of war, and occasioned his disgrace. He retired, however, of his own accord, in 1568; and spent the rest of his life at his country-seat at Vignai, where he died in 1573, aged 68. His poems are esteemed. He also published some excellent speeches and memoirs.

HOSPITAL, popularly **SPITAL**, a place or building erected, out of charity, for the reception and support of the poor, aged, infirm, sick, and otherwise helpless. The word is formed of the Latin *hospes*, "host, stranger." See **HOST**.

In the ages of the church, the bishop had the immediate charge of all the poor, both found and diseased, as also of widows, orphans, strangers, &c.—When the churches came to have fixed revenues allotted them, it was decreed, that at least one fourth part thereof should go to the relief of the poor; and to provide for them the more commodiously, divers houses of charity were built, which are since denominated *hospitals*. They were governed wholly by the priests and deacons, under the inspection of the bishop. In course of time, separate revenues were assigned for the hospitals; and particular persons, out of motives of piety and charity, gave lands and money for erecting of hospitals. When the church-discipline began to relax, the priests, who till then had been the administrators of hospitals, converted them into a sort of benefices, which they held at pleasure, without giving account thereof to any body; reserving the greatest part of the income to their own use; so that the intentions of the founders were frustrated.—To remove this abuse, the council of Vienne expressly prohibited the giving any hospital to secular priests in the way of a benefice; and directed the administration thereof to be given to sufficient and responsible laymen, who should take an oath, like that of tutors, for the faithful discharge thereof, and be accountable to the ordinaries.—This decree was executed and confirmed by the council of Trent.

In Britain, hospitals are buildings properly endowed, or otherwise supported by charitable contributions, for the reception and support of the poor, aged, infirm, sick, or helpless.

A charitable foundation laid thus for the sustenance and relief of the poor, is to continue for ever. Any person seized of an estate in fee, may, by deed inrolled in chancery, erect and found an hospital, and nominate such heads and governors therein as he shall think fit; and this charitable foundation shall be incorporated, and subject to the inspection and guid-

ance of the heads and visitors nominated by the founder. Likewise such corporations shall have, take, and purchase lands, so as not to exceed 200 l. a-year, provided the same be not held of the king; and to make leases, reserving the accustomed yearly rent *.

HOSPITAL-FEVER, a name given to the malignant catarrhal fever, as being frequent in hospitals. See (the *Index* subjoined to) **MEDICINE**.

HOSCHIUS (Sidonius), a jesuit, who was born at Marke, in the diocese of Xpres, in 1596, and died at Tongres in 1653. He wrote some elegies and other poems in Latin, with great purity and elegance.

HOSPITALITY, the practice of entertaining strangers.—Dr Robertson speaking of the middle ages, says, "Among people whose manners are simple, and who are seldom visited by strangers, hospitality is a virtue of the first rank. This duty of hospitality was so necessary in that state of society which took place during the middle ages, that it was not considered as one of those virtues which men may practise or not, according to the temper of their minds and the generosity of their hearts. Hospitality was enforced by statutes, and those who neglected the duty were liable to punishment. The laws of the Slavi ordained that the moveables of an inhospitable person should be confiscated, and his house burnt. They were even so solicitous for the entertainment of strangers, that they permitted the landlord to steal for the support of his guest."

HOSPITALLERS, an order of religious knights, now known by the title of *knight of Malta*. See **MALTA**.

HOSPITIUM, a term used in old writers either for an inn or a monastery, built for the reception of strangers and travellers. See **INN** and **MONASTERY**.

HOSPODAR, a title borne by the princes of Walachia and Moldavia, who receive the investiture of their principalities from the grand signior. He gives them a vest and standard; they are under his protection, and obliged to serve him, and he even sometimes depose them; but in other respects they are absolute sovereigns within their own dominions.

HOST, **HOSSES**, a term of mutual relation, applied both to a person who lodges and entertains another, and to the person thus lodged, &c.—The word is formed of the Latin *hospes*, which some will have thus called, *quasi hospitium* or *ostium petens*; for *ostium* was anciently wrote with an aspirate.—Thus the innkeeper says, he has a good *host*, in speaking of the traveller who lodges with him; and the traveller, again, says, he has a kind *host*, in speaking of his landlord.

It must be observed then, that it was the custom among the ancients, when any stranger asked for lodging, for the master of the house, and the stranger, each of them to set a foot on their own side of the threshold, and swear they would neither of them do any harm to the other.—It was this ceremony that raised so much horror against those who violated the law or right of hospitality on either side; inasmuch as they were looked on as perjured.

Instead of *hospes*, the ancient Latins called it *hospis*; as Cicero himself informs us: though in course of time, *hospis* came to signify an enemy; so much was the notion of hospitality altered.

Hospital
||
Host.* See Cor-
poration.

Hot
||
Hot-beds.

Host, in the church of Rome, a name given to the elements used in the eucharist, or rather to the consecrated wafer; which they pretend to offer up every day, a new host or sacrifice for the sins of mankind.—They pay adoration to the host, upon a false presumption that the elements are no longer bread and wine, but transubstantiated into the real body and blood of Christ. See TRANSUBSTANTIATION.

HOSTAGE, a person given up to an enemy as a security for the performance of the articles of a treaty.

Hot-Beds, in gardening, beds made with fresh horse-dung, or tanner's bark, and covered with glasses to defend them from cold winds.

By the skilful management of hot-beds, we may imitate the temperature of warmer climates; by which means, the seeds of plants brought from any of the countries within the torrid zone, may be made to flourish even under the poles.

The hot-beds commonly used in kitchen-gardens, are made with new horse-dung mixed with the litter of a stable, and a few sea-coal-ashes, which last are of service in continuing the heat of the dung. This should remain six or seven days in a heap; and being then turned over, and the parts mixed well together, it should be again cast into a heap; where it may continue five or six days longer, by which time it will have acquired a due heat. These hot-beds are made in the following manner: In some sheltered part of the garden, dig out a trench of a length and width proportionable to the frames you intend it for; and if the ground be dry, about a foot or a foot and a half deep; but if it be wet, not above six inches: then wheel the dung into the opening, observing to stir every part of it with a fork, and to lay it exactly even and smooth on every part of the bed, laying the bottom part of heap, which is commonly free from litter, upon the surface of the bed: and if it be designed for a bed to plant out cucumbers to remain for good, you must make a hole in the middle of the place designed for each light about ten inches over, and six deep, which should be filled with good fresh earth, thrusting in a stick to shew the places where the holes are; then cover the bed all over with the earth that was taken out of the trench, about four inches thick, and put on the frame, letting it remain till the earth be warm, which commonly happens in three or four days after the bed is made, and then the plants may be placed in it. But if your hot-bed be designed for other plants, there need be no holes made in the dung; but after having smoothed the surface with a spade, you should cover the dung about three or four inches thick with good earth, putting on the frames and glasses as before. In making these beds, care must be taken to settle the dung close with a fork; and if it be pretty full of long litter, it should be trod down equally on every part. During the first week or ten days after the bed is made, you should cover the glasses but slightly in the night, and in the day-time carefully raise them, to let out the steam: but as the heat abates, the covering should be increased; and as the bed grows cold, new hot dung should be added round the sides of it.

The hot-bed made with tanner's bark, is, however, much preferable to that described above, especially

for all tender exotic plants and fruits, which require an even degree of warmth to be continued for several months, which cannot be effected with horse-dung. The manner of making them is as follows: Dig a trench about three feet deep, if the ground be dry; but if wet, it must not be above a foot deep at most, and must be raised two feet above the ground. The length must be proportioned to the frames intended to cover it; but it should never be less than ten or twelve feet, and the width not less than six. The trench should be bricked up round the sides to the above-mentioned height of three feet, and filled in the spring with fresh tanner's bark that has been lately drawn out of their vats, and has lain in a round heap, for the moisture to drain out of it, only three or four days: as it is put in, gently beat it down equally with a dung-fork; but it must not be trodden, which would prevent its heating, by settling it too close: then put on the frame, covering it with glasses; and in about ten days or a fortnight, it will begin to heat; at which time plunge your pots of plants or feed into it, observing not to tread down the bark in doing it. These beds will continue three or four months in a good temper of heat; and if you stir up the bark pretty deep, and mix a load or two of fresh bark with the old when you find the warmth decline, you will preserve its heat two or three months longer. Many lay some hot horse-dung in the bottom of the trench under the bark; but this ought never to be practised unless the bed is wanted sooner than the bark would heat of itself, and even then there ought only to be a small quantity of dung at the bottom.

The frames which cover these beds, should be proportioned to the several plants they are designed to contain. If they are to cover the ananas or pine-apple, the back part should be three feet high, and the lower part fifteen inches: if the bed be intended for taller plants, the frame must be made of a depth proportionable to them: but if it be for sowing of seeds, the frame need not be above fourteen inches high at the back, and seven in the front; by which means, the heat will be much greater.

HOTEL, a French term, anciently signifying a house, or dwelling place.—It is now more commonly used for the palaces, or houses of the king, princes, and great lords. In this sense they say, the *hotel de Conde*, *hotel de Conti*, *hotel du Louvre*, &c.

The *grand prévost de l'hotel*, is the first judge of the officers of the king's household. His jurisdiction is much like that of lord steward of the household of the king of England.

The *hotel de ville* is what we call a *town-house*, or *town-hall*.

HOTEL, is likewise used for a large inn, also for a large lodging-house ready furnished.

HOTMAN (Francis), one of the most learned civilians in the 16th century. He professed law at Bourges: but, on account of religion, retired to Geneva, read lectures on civil law there, and published books with such strength against the persecutors, that great promises were made to him to engage him not to write any more in that manner; but he did not regard their offers. He died at Basil in 1590. His *Franco-Gallia* is well known, having been done in English by lord Moleworth. Some persons think he

Hot-beds
||
Hotman

Hottentots. was the author of *Vindicie contra Tyrannos*. All his works were printed at Geneva in 1599, in 3 vols folio.

HOTTENTOTS, a people in the southern part of Africa, whose country surrounds the empire of Monomotapa, in form of a horse-shoe, extending, according to Magin, from the Negroeth of Cabo as far as the Cape of Good Hope; and from thence northward to the river Magnica, or Rio de St Spiriti, including Mattatan a distinct kingdom. According to Sanutus, this coast, beginning at the Mountains of the Moon under the tropic of Capricorn in $23^{\circ}\frac{1}{2}$ S. Lat. extends north beyond the Cape to the coast of Zanguebar; having the Indian sea on the east, the Ethiopic on the west, the southern ocean on the south; and on the north the kingdoms of Mattatan, Monomotapa, and the coast of Zanguebar, or rather the Mountains of the Moon, which divide it from the rest of the continent.

The Europeans first became acquainted with this country in the year 1493, when Bartholomew Diaz, a Portuguese admiral, discovered the most southerly point of Africa now called the *Cape of Good Hope*, but by him *Cabo dos todos tormentos*, or Cape of all Plagues, on account of the storms he met with in the neighbourhood; but John, then king of Portugal, having from the account of Diaz concluded that a passage to the East Indies was now discovered, changed the name to that of the *Cape of Good Hope*, which it still retains. In 1497, it was circumnavigated by Vasco de Gama, who made a voyage to India that way; however, it remained useless to Europeans till the year 1650, when Van Riebeck a Dutch surgeon first law the advantages that would accrue to the East India company in Holland, from a settlement at such a convenient distance both from home and from India. The colony which he planted has ever since continued in the hands of the Dutch, has greatly increased in value, and is visited by all the European ships trading to the East Indies.

The country now possessed by the Dutch is of pretty considerable extent, and comprehends that part of the African coast on the west called *Terra de Natal*. It is naturally barren and mountainous; but the industry of the Dutch hath overcome all natural difficulties, and it now produces not only a sufficiency of all the necessaries of life for the inhabitants, but also for the refreshment of all the Europeans who pass and repass that way.

The coast abounds in capes, bays, and roads. Thirty leagues to the east of the Cape of Good Hope, in S. Lat. $34^{\circ} 21'$, is another Cape which runs out beyond 35° , called by the Portuguese, who first doubled it, *Cabo dos Agulhas*, or the *Cape of Needles*, on account of some strange variations in the magnetic needle observed as they came near it. Near this Cape is a flat shore, with plenty of fish: it begins in the west near a fresh-water river, and extending 15 leagues in the main sea, ends in the east near *Fish-bay*. Cabo Falso, so called by the Portuguese, who returning from India mistook it for the Cape of Good Hope, lies to the eastward between these two capes, about eight or nine leagues beyond that of Good Hope. Along the coasts, on both sides of the Cape of Good Hope, are many fine bays, where ships may ride in the greatest

safety. Twenty-seven leagues to the northwest is Sal-donha bay, so named from a Portuguese captain shipwrecked on the coast. The largest and most commodious is *Table or Vafel Bay*, on the south, and near the mountain of that name, six leagues in circumference, with four-fathom water close to the beach, and sheltered from all but northwest winds, which blow straight up. Opposite to this bay is *Roku Eilan*, or the Island of Rabbits, in $34^{\circ} 30'$ S. Lat. 67 leagues east from the Cape of Good Hope. Peter Both, in 1661, discovered a bay, which he named *Ulegst*, sheltered only from north winds, in which is a small island, and on the west a rivulet of fresh water extremely convenient for European mariners. Twenty-five or thirty leagues farther east, Both discovered Marshall Bay, afterwards named by the Portuguese *Seno Formoso*. Next to this is *Seno de Lago*, from its resemblance to a lake. There are several roads in this bay, and an island called *Ilha dos Cuos*. Cabo de St. Francisco, and Cabo das Serras are marked upon charts between these two bays. Near the latter of these capes is Cabo de Are-cito, and the island Contento; and something more north-east is St Christopher's river, called *San Chri-stovano* by the Portuguese, and by the Hottentots *Nagod*. The country beyond this river, was called by the Portuguese, who discovered it on the day of our Lord's nativity, *Terra de Natal*. Between the Cape of Good Hope and Cabo das Agulhas are the Sweet, Salt, and Jagulina rivers, which run into the sea, and Sweet-water river flows from the Table-mountain.

The most remarkable mountains in this country are Table-hill, Lion-hill, Wind-hill, and the Tiger-hills. The three first lie near Table-bay, and surround Table-valley, where the Cape-town stands. The first is the highest, and extends to the south and a little west, from the centre of the valley. Kolben determined its height to be 1857 feet. Mr Forster, who lately visited this part of the world, informs us, that "the extremity of Africa towards the south is a mass of high mountains, of which the outermost are craggy, black, and barren, consisting of a coarse granite, which contains no heterogeneous parts, such as petrified shells, &c. nor any volcanic productions. The ground gradually rises on all sides towards the three mountains which lie round the bottom of the bay, keeping low and level only near the sea-side, and growing somewhat marshy in the isthmus between False and Table Bays, where a salt rivulet falls into the latter. The marshy part has some verdure, but intermixed with a great deal of sand. The higher grounds, which, from the sea-side, have a parched and dreary appearance, are, however, covered with an immense variety of plants, among which are a prodigious number of shrubs, but scarce one or two species that deserve the name of trees. There are also a few small plantations wherever a little run of water moistens the ground. The ascent of Table-mountain is very steep and difficult, on account of the number of loose stones which roll away under the feet of the traveller. About the middle of the mountain is a bold, grand chasm, whose walls are perpendicular and often impending rocks, piled up in strata. Small rills of water ooze out of crevices, or fall from precipices in drops, giving life to hundreds of plants and low shrubs,

Hottentots.

Hottentots. shrubs in the chasm. The summit of the mountain is nearly level, very barren, and bare of soil; several cavities, however, are filled with rain water, or contain a small quantity of vegetable earth, from whence a few odoriferous plants draw their nourishment. Some antelopes, howling baboons, solitary vultures, and toads, are sometimes to be met with on the mountain. The view from thence is very extensive and picturesque. The bay seems a small pond or basin, and the ships in it dwindled to little boats; the town under our feet, and the regular compartments of its gardens, look like the work of children."

Most accounts of this country that have been published mention a surprising phenomenon which is annually to be seen on the top of Table-hill from September to March; namely, a white cloud hovering on its top, and is reckoned the cause of those terrible south-east winds with which the Cape is infested. This cloud, called by sailors *The Devil's table-cloth*, is said by some to appear at first no bigger than a barley-corn; then increases to the size of a walnut, and soon after covers the whole top of the mount. But, according to Mr Kolben, it is never less, even on its first appearance, than the size of a large ox; often bigger. It hangs in several fleeces over the Table-hill, and the Wind or Devil's-hill; which fleeces, at last uniting, form a large cloud that covers the summits of these two hills. After this has rested for some time without change or motion, the wind bursts out suddenly from it with the utmost fury. The skirts of the cloud are white, but seem much more compact than the matter of common clouds; the upper parts are of a leaden colour. No rain falls from it, but sometimes it discovers a great deal of humidity; at which times it is of a darker colour, and the wind issuing from it is broken, raging by fits of short continuance. In its usual state, the wind keeps up its first fury unabated for one, two, three, or eight days; and sometimes for a whole month together. The cloud seems all the while undiminished, though little fleeces are from time to time detached from it, and hurried down the sides of the hills, vanishing when they reach the bottom, so that during the storm the cloud seems to be supplied with new matter. When the cloud begins to brighten up, these supplies fail, and the wind proportionably abates. At length, the cloud growing transparent, the wind ceases. During the continuance of these south-east winds, the Table-valley is torn by furious whirlwinds. If they blow warm, they are generally of short duration; and in this case, the cloud soon disappears. This wind rarely blows till after sunset, and never longer than till towards midnight, though the cloud remains, but then it is thin and clear: but when the wind blows cold, it is a sure sign that it will last for some time, an hour at noon and midnight excepted; when it seems to lie still to recover itself, and then lets loose its fury anew.

The Europeans at the Cape consider the year as divided into two seasons, which they term *monsoons*. The wet monsoon or winter, and the dry one or summer. The first begins with our spring in March; the latter with September, when our summer ends. In the summer monsoon reign the south-east winds already mentioned; which, though they clear and render the air more healthy, yet make it difficult for ships outward

bound to enter Table-bay. In the bad season, the Cape is much subject to fogs; and the north-west winds and rain make the inhabitants stay much at home. But there are frequent intermissions and many clear days till June and July; when it rains almost continually, and from thence till summer. The weather in winter is cold, raw, and unpleasant; but never more rigorous than autumn in Germany. Water never freezes to above the thickness of half a crown; and as soon as the sun appears, the ice is dissolved. The Cape is rarely visited by thunder and lightning, excepting a little near the turn of the seasons, which never does any hurt. During the continuance of the south-east winds which rage in summer, the sky is free of all clouds except that on the Table and Wind Hills already mentioned; but during the north-west winds, the air is thick, and loaded with heavy clouds big with rain. If the south-east winds should cease for any length of time, the air becomes sickly by reason of the sea-weeds driving ashore and rotting; hence the Europeans are at such times affected with head-achs and other disorders: but, on the other hand, the violence of those winds subjects them to inflammations of their eyes, &c.

The natives of this country are called *Hottentots*, in their own language; a word of which it is vain to inquire the meaning, since the language of this country can scarce be learned by any other nation. The *Hottentot* language is indeed said to be a composition of the most strange and disagreeable sounds, deemed by many the disgrace of speech, without human sound or articulation, resembling rather the noise of irritated turkeys, the chattering of magpies, hooting of owls, and depending on extraordinary vibrations, inflexions, and clappings of the tongue against the palate.—If this account is true, however, it is obvious, that all the relations we have concerning the religion, &c. of the *Hottentots* derived from themselves, must fall to the ground, as nobody can pretend to understand a language in itself unintelligible. The manners and customs of those people, however, are easily observable, whether they themselves give the relation or not; and if their language is conformable to them, it is no doubt of a nature sufficiently wonderful.

The *Hottentots*, according to the most authentic accounts, are, of all human creatures, the most filthy. Human urine, the excrements of beasts, entrails, and garbage, foot, grease, &c. are their sole delight, and even used as symbols of honour and dignity. As soon as a child is born, they rub it all over with fresh cow-dung; which when dried they rub off, and then wash it with the juice of the *Hottentot* fig. When this juice has dried up, they rub the child over with sheep's grease, or melted butter; and when it has well soaked, they sprinkle on the powder of Buchu (the herb *SPICEA*), which now sticks all over like a crust. When her time has expired, the mother in like manner purifies herself first with cow-dung, and then with grease and buchu; after which she is restored to the embraces of her husband, who must previously undergo a purification of the same kind. They are of an olive colour when born: but the parents take care to make their children as black as possible by a daily unction with a mixture of grease and foot; a ceremony which is continued during the rest of their lives, and

Hottentots. and which makes them appear much blacker than they really are. As soon as the child is born, the women break down the bridge of the nose with their thumbs, looking upon a high nose as a great deformity; and hence it hath been pretty generally believed among Europeans, that the *Hottentots* are born with flat noses.

Every male, when arrived at the age of eight or ten years, according to *Hottentot* law, ought to be deprived of the left testicle; but in cases where the parents are poor, this ceremony is deferred till they are able to answer the expence. The origin of a custom so very extraordinary would no doubt afford entertainment to the curious; but nothing satisfactory hath been said upon the subject. Most authors are of opinion, that this is done to make them run the swifter; and many of the natives themselves assign the same reason: but Kolben was informed by some of the most intelligent *Hottentots*, that it has been a law among them from time immemorial, "that no man should be allowed to have carnal knowledge of a woman, till deprived of his left testicle." Should any marry without this necessary mutilation, both parties would lie at the mercy of the rulers, and the woman perhaps be torn in pieces by her own sex; among whom it is a prevailing opinion, that a man with two testicles constantly begets twins. This extraordinary ceremony is performed in the following manner. The patient being daubed over with the fat of a sheep newly killed, lies on his back on the ground at full length, with his hands and feet tied. His friends lie upon him, in order to keep him from moving. The operator then, with a common table or case knife, laying hold of the left testicle, makes an orifice in the scrotum about an inch and an half long. Thro' this orifice he squeezes out the testicle in a moment, ties up the vessels, thrusts in a little ball of the size of the testicle, composed of sheep's fat and several herbs pulverised. He then stitches up the wound with a thread made of a sheep's sinew, and a needle in the form of an awl. The bands of the patient being then unloosed, the operator anoints him again with the warm fat of the sheep, turning him sometimes on his back and sometimes on his belly, while the poor boy is sweating and almost convulsed with pain. After this, he pisses all over him, rubbing the precious liquor into his skin as well as he can; and the ceremony being thus ended, the patient crawls to a little hut raised for the purpose, and in two or three days becomes as well as ever.

The next essential ceremony is the receiving the youth into the society of men. This is performed when they have arrived at the age of 18. Before this time they are confined to the tuition of their mothers, whom they constantly follow, and dare not, before the performance of the ceremony, converse even with their own fathers. The appointed time being arrived, the inhabitants are assembled, and the men seated in a circle, and the candidate ordered to sit down without upon his hams or heels, but in such a manner as not to touch the ground by at least three inches. The oldest man then rises, and, having obtained consent for the youth's admission, steps up to him and acquaints him, that he must thenceforward forsake his mother, and the company of the women, with every childish

amusement, and learn to behave as a man, both in his words and actions. The candidate then, being previously debauched with grease and foot, squats down to receive the smoking inundation of urine, which the orator discharges all over him with great formality. The old men then congratulate him on the honour done him, and add the following benedictions, "Good luck attend thee;—Live to be old;—Increase and multiply;—May thy beard grow soon."

This ceremony is usually followed by the young man's marriage. All overtures of the matrimonial kind among the *Hottentots*, are made by the father or nearest relation of the man, to the father or nearest relation of the woman. The father and his son wait on the woman's friends; and the lover is first employed in preparing and presenting the company with tobacco. They all smoke, and nothing is said about the matter till their heads become giddy with the fume: then the father opens the business to the woman's father, and demands her for his son. The other leaves the room to consult with his wife; but quickly returns with a positive answer; which is seldom in the negative, unless in case of a prior engagement. If the young woman does not like the match which her parents have agreed to, she has only one chance to avoid it; namely, to lie down with her lover on the ground, and play with him all night at pinching, tickling, and whipping. If she conquers, she fairly gets rid of him; but if he subdues her, which is generally the case, she must marry him. After this the young fellow goes to the habitation of the bride, attended by all his relations and friends, male and female, driving before them one or more oxen, according to their wealth. They are received with great joy; and the oxen being killed, they besmear themselves plentifully with the fat, powdering themselves thick all over with buchu, and the women paint their cheeks, forehead, and chin, with red chalk. This being done, they perform the wedding ceremony in the following manner. The men squat themselves in a circle, in the centre of which the bridegroom is seated in the same posture. At some little distance the women do the same round the bride. Then the priest, or master of religious ceremonies, enters the mens circle, and coming up to the bridegroom pisses a little on him, who with his long nails (for the *Hottentots* never pare their nails) makes furrows in the grease and buchu with which he is covered, that the urine may penetrate the better. He then does the same kindness to the bride; returning from the one to the other, till his whole stock is exhausted, pronouncing all the time short blessings to the following purpose: "May you live happily together; may you have a son before the year's end; may he be a good huntsman and a warrior."

The *Hottentots* have an honourable order among them, consisting of such as have singly encountered and slain a lion, tyger, leopard, elephant, rhinoceros, or elk. The hero, after his return from the exploit to the village, retires to his own hut, where he has not sat long, till an old man, deputed by the inhabitants of the *kraal* or village, comes to invite him to receive the honours due to his merit. The champion rises and follows his conductor to the middle of the village, where all the men are assembled and waiting his arrival. He there squats down on a mat prepared for him; while
all

Hottentots.

Hottentots. all the old men squat in a circle round him. The old deputy then marches up to him, and pisses upon him from head to foot, pronouncing certain words. If the deputy is the hero's friend, he lays him under a deluge of water; for the more plentifully he is besprinkled, the greater is the honour; and the urine is rubbed in by the hero himself with the greatest eagerness. The deputy then lights a pipe of tobacco, which he circulates through the company till nothing but ashes remain in the pipe. These the deputy shakes on the new knight, who is congratulated on the high honour he has received and the service he has done his country. After this he takes three days rest, during which his wife is forbidden to come near him. On the third day he kills a sheep, receives his wife again, and rejoices with his friends and neighbours; wearing ever after the bladder of the beast he has killed, fastened to his hair, as a mark of honour. The Hottentots express greater joy at the destruction of a tyger than of any other wild beast.

The dress of the Hottentots is perfectly agreeable to the nastiness of those customs already described. The skin of a wild beast, or sheep, prepared with cowdung and grease, hangs like a mantle over the shoulders, high or low, open or closed, according to the season of the year, or the customs of the tribe. The men, who have no covering but a composition of fat, foot, and dirt, in the most raging heats, wear cat or lamb-skin caps in cold and wet seasons. The face and forehead of the neck are always bare; and, the pudenda excepted, which are covered with a kind of apron, they go naked from the hips downwards. Leather stockings, and sandals cut out of the raw hides of oxen or elephants, are used occasionally in driving their herds to pasture, or in passing sands or rocks. A greasy pouch hangs about their necks, with a knife, pipe, tobacco, and a small piece of wood called *sassa*, burnt at both ends, as an amulet against witchcraft. Three ivory rings adorn the left arm; to which, on journeys, is fastened a bag with provisions. The *kirri* and *rackhum* sticks (which they use in hunting) are in the right hand; and another is carried in the left, with the bushy tail of a wild cat, fox, or other animal, fastened to it for a handkerchief. The honquers or captains, who were formerly distinguished only by fair skins of tigers or wild-cats, now appear at the head of the army, in councils, and on every solemn occasion, with brass crowns, and brass-headed canes. These ornaments were presented by the Dutch to the chiefs and captains of the nations in alliance with them; and are now annexed to defend with, and are esteemed an unalienable property and distinctive badge of their dignity.

Most writers have affirmed that the Hottentot women wear the guts of sheep and other animals by way of ornament about their legs; but this is a mistake. The girls from their infancy to about 12 years old, wear bulrushes tied in rings about their legs from the knee down to the ankle. When they pass that age, they change the matter of these rings, from bulrushes to slips of sheep and calf-skin, of the thickness of the little finger. They singe off the hair, and then turn inwards the side on which it grew. Some grown women have above 100 of these rings on the leg, so nicely wound about and fitted, that they look like one continued swathe, and by long wearing assume the hard-

ness of wood. These rings are kept from falling down by large wrappers of leather or rushes about the ankles; and serve both as an ornamental distinction to the sex, and for preserving the legs from being scratched or torn in the fields. Like other savages, the Hottentots are very fond of brass buttons, bits of looking-glasses, &c. and some wear on their foreheads a small plate of polished iron in the shape of an half-moon.

The diet of the Hottentots is the flesh and entrails of their cattle, and certain wild beasts, with roots and fruits of different kinds. But, excepting at their public feasts, they rarely kill any cattle for their own eating, unless in cases of great necessity. Yet if any of their cows or sheep die naturally, they make no scruple to eat them, and esteem them as wholesome food. If the men are not contented with the roots, fruits, or milk, which the women take care to provide, they go out a-hunting, or, if near the sea, a-fishing. They always hunt in large companies. The entrails of cattle, or of such wild beasts as they kill for food, are looked upon as most exquisite eating, after they have been boiled in beasts blood mingled with milk. Sometimes they broil them; but in general they eat them half raw. In either case, they devour their victuals in a very furious and ravenous manner, without any regard to decency. They have no set meals; but eat as their appetite or humour directs, either by night or day. In fair weather, they eat in the open air; in wind or rain, in their huts. They have traditional laws as to abstaining from certain meats. Swines flesh, and fish without scales, are prohibited to both sexes: hares and rabbits are forbidden to the men, but not to the women: the pure blood of beasts, and the flesh of the mole, are forbidden to the women, but not to the men.

The nastiness of the Hottentots makes them swarm with lice, some of which are exceedingly big. These last they eat, throwing away the unsizeable ones; and if they are asked how they can devour such detestable vermin, they plead the law of retaliation, and urge that it is no shame to eat those who would eat them. The Europeans at the Cape have a sort of field-shoes, cut out of the raw hide of an ox or stag, with the hairy side outwards. These, when thrown away, the Hottentots gather and lay up against a rainy day, when their provisions fall short, and eat them heartily; first singeing off the hair, then soaking them in water, and lastly broiling them on the fire.

These are the customs which chiefly distinguish the Hottentots from all other people on earth; but besides these, they have others in common with the generality of barbarous nations. If a woman is delivered of female twins, they generally destroy the worst-favoured; or if the children are male and female, the latter perishes, by being exposed on the bough of a tree, or buried alive with the consent of the whole village. Some of these deserted infants have been found by the Europeans, and educated by them; yet it is said, that, when arrived at the years of maturity, they always renounced the European manners, apparel, and religion, to conform to those of their own people. After a youth is discharged from the tuition of his mother in the manner already mentioned, he may insult, and even beat her, whenever he pleases; for which he receives applause instead of reproof. Nay, it is usual for them to go and abuse their mothers immediately.

Hotentots. mediately after their being admitted into the order of men, to shew their contempt for the conversation of females. If the eldest son, or, in default of sons, the next male relation, determines to get rid of his father, mother, or other relation, who are considered as superannuated, and incapable of any useful domestic performance, the village is convoked, and informed of the condition and request of the heir. Consent is never refused; and a day is immediately appointed for the removal of the superannuated man or woman. There is now no distinction of persons; the wealthiest man, or the captain of the village, must submit as well as the meanest, and is compelled to surrender his whole estate to the claimant. The whole village accompany him to a lonely hut, where he is left with a small quantity of provisions set within his reach, where he soon perishes, or is devoured by wild beasts. Adultery among the Hotentots is always punished with death; but they allow divorce, if the husband can shew sufficient cause for it; and of the sufficiency of which the rest of the village are the judges. In this case, the men may marry again, but the woman is not allowed to do so while her husband lives. If a widow marries, she cuts off a joint of her finger, beginning with the little one, for every husband after the first.

In other respects, the Hotentots are the most lazy people in the world: they esteem thinking a labour, and avoid both as capital plagues; passing three parts in four of their lives in the most shameful stupidity and idleness. Occasionally, however, they are surprisingly active. In swiftness, they are said to surpass the fleetest horse; and are famed for their dexterity in discharging their arrows, javelins, &c. Though unacquainted with agriculture and the qualities of tobacco before the arrival of the Europeans, they excel, and are consulted by most of those resident in their country, concerning the management of lands and the choice of tobacco. Their mutual affection, liberality, and benevolence, extend to each other in the most friendly manner; and, naturally compassionating distresses, they are extremely hospitable to strangers of every nation. They are of good sense and integrity in the execution of justice, and in chastity excel almost all other nations in the world.

Besides the methods of fighting with bows and arrows, darts, &c. common to all barbarous nations, the Hotentots have a kind of oxen trained to war. These they call *Bakkeleyers*, or fighting oxen; and the skill of the Hotentot generals is chiefly displayed by choosing the most proper time and place for driving in the beasts among the enemy. These animals stamp, kick, and gore, with incredible fury; and, if well followed by the men, speedily rout the enemy. A battle decides the war; for an Hotentot army once routed never rallies again. The conquerors triumph and pursue the enemy with astonishing shouts and exclamations. All prisoners are killed; and both armies bury their dead, which are never insulted or plundered. Deserters and spies are immediately put to death.

The Hotentots are very shy of entering upon any discourse concerning their religion; whence it hath been doubted whether they have any at all. Kolben, however, assures us, that they believe in a God, the author of all things. This supreme power they call

the *God of gods*; and say, "he is a good man, who does nobody any hurt, and from whom none need be apprehensive of any, and that he lives far beyond the moon." But it does not appear, that they have any intimation of worship directly regarding this supreme deity. They excuse themselves when pressed on this head, by a tradition, that their first parents so grievously offended this great God, that he cursed them and their posterity with hardness of heart; so that they know little about him, and have less inclination to serve him. They adore the moon, by assembling at night in the fields, killing cattle, and offering milk and flesh. This they do constantly at the full and change. They welcome her; and then invoke her for favourable weather, to grant them fodder for their cattle, &c. They also regard as a good deity an insect of the beetle kind, peculiar to these countries. It is about the size of a child's little finger, the back green, the belly speckled red and white, with two wings and two horns. Wherever they meet this animal, they pay it the highest honour and veneration. If it visits a village, they assemble about it in troops as if a divinity had appeared among them; they kill a sheep or two as a thank-offering, and esteem it as an omen of the greatest happiness and prosperity. They believe its appearance expiates all their guilt. If the insect lights upon a Hotentot, the person is looked upon as a saint, and ever after treated with uncommon respect. The village kills the fattest ox for a thank-offering; and the caul powdered with buchu, and twisted like a rope, is put collar-wise about the saint's neck, and there must remain till it rots off. A sort of veneration is also paid to deceased saints or heroes. They believe in an evil deity, whom they represent as a little, malicious, ill-natured being, a great enemy to Hotentots, and the author of all the mischiefs which befall them in this world, beyond which he hath no power. They therefore worship and offer sacrifices to him, in order to soften and bring him into better temper. Some of them even pretend, that they have seen him in the shape of a deformed, hairy, frightful monster, dressed in white, with a head and feet like those of a horse. All sudden pain, crotch accidents, and sickness, are by the Hotentots ascribed to witchcraft; so that charms and amulets are in high esteem among them. They seem to have no notion of a future state, either good or bad, after death, much less of a resurrection; yet that they believe the immortality of the soul, seems evident from the following particulars. 1. They offer prayers and praises to the good Hotentots deceased. 2. They are apprehensive of the return of departed spirits to molest them; for which reason they remove their village on the death of any of its inhabitants. 3. They believe it is in the power of wizards and witches to lay these spirits. But they seem to think these departed souls remain in or about those places where the body was inhabited by them; for of a heaven or hell, rewards or punishments, they have not the least notion.

This appears to be the whole that can be collected concerning the Hotentot religion, and to which they are invincibly attached. If you attempt to reason with them, they hear you sullenly, or quit you abruptly. They avoid, if possible, any religious subject. Some of them have pretended a belief of Christianity;

Hotentots. nity: but when the motive was removed, they always returned to their former idolatry; and, in spite of all the endeavours of the Dutch missionaries at the Cape, they have never been able to make a single convert.

Of the cape-town and country adjacent peopled by the Dutch, Mr Foster gives the following account: "The town is neat and well built; looks white at a distance, and seems to rise out of a desert surrounded by broken masses of black and dreary mountains. The storehouses of the Dutch East-India company are all situated near the water, and the private buildings lie beyond them in a gentle ascent. The fort which commands the road, is on the east side of the town, but seems not to be of great strength; besides which, there are several batteries on both sides. The streets in the town are broad, and regular; all the principal ones are planted with oaks; and some have in their middle a canal of running water, which, on account of its small quantity, they are obliged to husband by sluices, so that parts of it are sometimes entirely drained, and occasion no very pleasant smell. The national character of the Dutch strongly manifests itself in this particular; their settlements being always supplied with canals, though reason and common sense evidently prove their noxious influence on the health of the inhabitants, especially at Batavia.

"The houses are built of brick, and many of them are white-washed on the outside. The rooms are in general lofty and spacious, and very airy, which the hot climate requires. There is but one church in the whole town; and that is extremely plain, and seems to be rather too small for the congregation. That spirit of toleration, which has been so beneficial to the Dutch government at home, is not to be met with in their colonies. It is but very lately that they have suffered even the Lutherans to build churches at Batavia, and at this place; and at the present time, a clergyman of that persuasion is not tolerated at the Cape, but the inhabitants are obliged to content themselves with the chaplains of Danish and Swedish East-India-men, who give them a sermon, and administer the sacrament once or twice a-year, and are very handsomely rewarded. The government and the inhabitants do not give themselves the trouble to attend to a circumstance of so little consequence in their eyes as the religion of their slaves, who in general seem to have none at all. A few of them follow the Mahomedan rite; and weekly meet in a private house belonging to a free Mahomedan, in order to read or rather chaunt several prayers and chapters of the Khoran. As they have no priest among them, they cannot partake of any other acts of worship (A).

"The slaves belonging to the company, who amount to several hundreds, are lodged and boarded in a spacious house erected for that purpose, where they are likewise kept at work. Another great building serves as an hospital for the sailors belonging to the Dutch East-India ships, which touch here, and commonly have prodigious numbers of sick on board, on their

voyage from Europe towards India. The vast number of men, sometimes six, seven, or eight hundred, which these ships carry out to supply the military in India, the small room to which they are confined, and the short allowance of water and salt provision they receive, on a long voyage through the torrid zone, generally make considerable havoc among them: it is therefore no uncommon circumstance at the Cape, that a ship on her passage thither from Europe, loses eighty or a hundred men, and sends between two and three hundred others dangerously ill to the hospital. A fact no less deplorable than certain, is, that the small expence and facility with which the *ziel-verkooopers* actually carry on their infamous trade of supplying the India company with recruits, makes them less attentive to the preservation of health among these poor people. Nothing is more common, in this and other Dutch colonies, than to meet with soldiers in the company's service, who, upon inquiry, acknowledge they have been kidnapped in Holland. There is an apothecary's shop belonging to the hospital, where the most necessary remedies are prepared, but no expensive drugs are to be found in it; and the method of administering to all the patients indiscriminately out of two or three huge bottles, full of different preparations, suffices to convince us, that the fresh air of the land, and the fresh provisions here, contribute much more to the recovery of the sick, than the skill of their physicians. Patients who are able to walk, are ordered to go up and down the streets every fair morning; and all kinds of greens, pot-herbs, fallads, and antiscorbutics, are raised for their use, in an adjacent garden belonging to the company. Travellers have sometimes praised and sometimes depreciated this garden, according to the different points of view in which it has been considered. It is true, a few regular walks of indifferent oaks, encompassed with elm and myrtle hedges, are not objects engaging enough to those who are used to admire the perfection of gardening in England, or who contemplate in Holland and France cypresses, box, and yew-trees cut out into vases, statues, and pyramids, or *charmilles* turned into pieces of architecture! But considering that the trees were planted in the beginning of this century, more for use than ornament; that they shelter the kitchen-herbs for the hospital, against the destructive violence of storms; and that they form the only shady and airy walks, comfortable to voyagers and sick persons in this hot climate: I cannot wonder that some should extol as "a delightful spot*," what others contemptuously call "a friar's garden†."

"The governor depends immediately upon the East-India company, and has the rank of an *edele heer*, the title given to the members of the supreme council of Batavia. He presides here over a council, consisting of a second or deputy-governor, the fiscal, the major (who commands the fort), the secretary, the treasurer, the comptroller of provisions, the comptroller of liquors, and the book-keeper; each of which has a branch of the company's commerce assigned to his

(A) We would not be understood to throw an odium on the Dutch in particular, when it is well known that the negroes, who wear the chains of the English and French, are equally neglected: it was only intended to awaken a fellow-feeling towards an unhappy race of MEN, among the colonists of all nations; and to remind them, whilst they enjoy, or *strive* to enjoy, the inestimable blessing of LIBERTY, to exert themselves in acts of humanity and kindness towards those from whom they withhold it, perhaps, without remorse.

* Byron.
† Hougoulinville.

Hottentots. his care. This council has the whole management of the civil and military departments; but the deputy-governor prebides over another, named the *court of justice*, which tries all offences and crimes, and consists of some of the members of the former; but no two relations can sit and vote in the same council, to prevent the influence of parties.

"The income of the governor is very considerable; for, besides a fixed appointment, and the use of houses, gardens, proper furniture, and every thing that belongs to his table, he receives about 10 dollars for every leagre of wine which the company buy of the farmer, in order to be exported to Batavia. The company allows the sum of 40 dollars for each leagre, of which the farmer receives but 24: what remains is shared between the governor, and second or deputy; the former taking two-thirds, which sometimes are said to amount to 4000 dollars per annum. The deputy-governor has the direction of the company's whole commerce here, and signs all orders to the different departments under him, as well as the governor to others. He and the fiscal have the rank of *upper koopman*. The fiscal is at the head of the police, and sees the penal laws put in execution: his income consists of fines, and of the duties laid on certain articles of commerce; but if he be strict in exacting them, he is universally detested. The found policy of the Dutch has likewise found it necessary to place the fiscal as a check, to overawe the other officers of the company, that they may not counteract the interests of their masters, or infringe the laws of the mother-country. He is, to that end, commonly well versed in juridical affairs, and depends solely upon the mother-country. The major (at present Mr Von Prehn, who received us with great politeness) has the rank of *koopman* or merchant: this circumstance surprises a stranger, who, in all other European states, is used to see military honours confer distinction and precedence; and appears still more singular to one who knows the contrast in this particular between Holland and Russia, where the idea of military rank is annexed to every place, even that of a professor at the university. The number of regular soldiers at this colony amounts to about 700; of which 400 form the garrison of the fort, near the Cape-town. The inhabitants capable of bearing arms form a militia of 4000 men; of whom a considerable part may be assembled in a few hours, by means of signals made from alarm-places in different parts of the country. We may from hence make some estimate of the number of white people in this colony, which is at present so extensive, that the distant settlements are above a month's journey from the Cape; but these remote parts lie sometimes more than a day's journey from each other, are surrounded by various nations of Hottentots, and too frequently feel the want of protection from their own government at that distance. The slaves in this colony are at least in the proportion of five or more to one white person. The principal inhabitants at the Cape have sometimes from 20 to 30 slaves, which are in general treated with great lenity, and sometimes become great favourites with their masters, who give them very good cloathing, but oblige them to wear neither shoes nor stockings,

reserving these articles to themselves. The slaves are chiefly brought from Madagascar, and a little vessel annually goes from the Cape thither on that trade; there are, however, besides them, a number of Malays and Bengalese, and some negroes. The colonists themselves are for the greatest part Germans, with some families of Dutch, and some of French Protestants. The character of the inhabitants of the town is mixed. They are industrious, but fond of good living, hospitable, and social; though accustomed to hire their apartments to strangers, for the time they touch at this settlement, and used to be complimented with rich presents of stuffs, &c. by the officers of merchant ships. They have no great opportunities of acquiring knowledge, there being no public schools of note at the Cape; their young men are therefore commonly sent to Holland for improvement, and their female education is too much neglected. A kind of dislike to reading, and the want of public amusements, make their conversation uninteresting, and too frequently turn it upon scandal, which is commonly carried to a degree of intemperacy peculiar to little towns. The French, English, Portuguese, and Malay languages, are very commonly spoken, and many of the ladies have acquired them. This circumstance, together with the accomplishments of singing, dancing, and playing a tune on the lute, frequently united in an agreeable person, make amends for the want of refined manners and delicacy of sentiment. There are, however, among the principal inhabitants, persons of both sexes, whose whole deportment, extensive reading, and well-cultivated understanding would be admired and distinguished even in Europe. Their circumstances are in general easy, and often very affluent, on account of the cheap rate at which the necessaries of life are to be procured: but they seldom amass such prodigious riches here as at Batavia; and I was told the greatest private fortune at the Cape did not exceed 100,000 dollars, or about 22,500 l. sterling.

"The farmers in the country are very plain hospitable people; but those who dwell in the remotest settlements seldom come to town, and are said to be very ignorant; this may easily be conceived, because they have no better company than Hottentots, their dwellings being often several days journey asunder, which must in a great measure preclude all intercourse. The vine is cultivated in plantations within the compass of a few days journey from the town; which were established by the first colonists, and of which the ground was given in perpetual property to them and their heirs. The company at present never part with the property of the ground, but let the surface to the farmer for an annual rent, which, though extremely moderate, being only 25 dollars for 60 acres*, yet does not give sufficient encouragement to plant vineyards. The distant settlements, therefore, chiefly raise corn and rear cattle; nay, many of the settlers entirely follow the latter branch of rustic employment, and some have very numerous flocks. We were told there were two farmers who had each 15,000 sheep, and oxen in proportion; and several who possessed 6000 or 8000 sheep, of which they drive great droves to town every year: but lions and buffaloes, and the fatigues

* Each acre of 666 square Rhynland rods, the rood of 12 feet. The proportion of the Rhynland foot to the English, is about 116 to 120.

Hottentots.

tigue of the journey, destroy numbers of their cattle before they can bring them so far. They commonly take their families with them in large waggons covered with linen or leather, spread over hoops, and drawn by 8, 10, and sometimes 12 pair of oxen. They bring butter, mutton-tallow, the flesh and skins of sea-cows (hippopotamus), together with lion and rhinoceros' skins, to sell. They have several slaves, and commonly engage in their service several Hottentots of the poorer sort, and (as we were told) of the tribe called *Boschemans*, or *Bushman*, who have no cattle of their own, but commonly subsist by hunting, or by committing depredations on their neighbours. The opulent farmers set up a young beginner by intrusting to his care a flock of 400 or 500 sheep, which he leads to a distant spot, where he finds plenty of good grass and water; the one-half of all the lambs which are yeaned fall to his share, by which means he soon becomes as rich as his benefactor.

"Though the Dutch company seem evidently to discourage all new settlers, by granting no lands in private property; yet the products of the country have of late years sufficed not only to supply the islands of France and Bourbon with corn, but likewise to furnish the mother-country with several ship-loads. These exports would certainly be made at an easier rate than at present, if the settlements did not extend so far into the country, from whence the products must be brought to the Table-bay by land-carriage, on roads which are almost impassable. The intermediate spaces of uncultivated land between the different settlements are very extensive, and contain many spots fit for agriculture; but one of the chief reasons why the colonists are so much divided and scattered throughout the country, is to be met with in another regulation of the company, which forbids every new settler to establish himself within a mile of another. It is evident, that if this settlement were in the hands of the commonwealth, it would have attained to a great population, and a degree of opulence and splendor, of which it has not the least hopes at present: but a private company of East-India merchants find their account much better in keeping all the landed property to themselves, and tying down the colonist, lest he should become too great and powerful.

"The wines made at the Cape are of the greatest variety possible. The best, which is made at M. Vander Spy's plantation of Constantia, is spoken of in Europe, more by report than from real knowledge; 30 leagues (a) at the utmost are annually raised of this kind, and each league sells for about 50*l*. on the spot. The vines from which it is made were originally brought from Shiraz in Persia. Several other sorts grow in the neighbourhood of that plantation, which produce a sweet rich wine, that generally passes for genuine Constantia in Europe. French plants of burgundy, muscade, and frontignan, have likewise been tried, and have succeeded extremely well, sometimes producing wines superior to those of the original soil. An excellent dry wine, which has a slight agreeable tartness, is commonly drank in the principal families, and is made of Madeira vines transplanted to the Cape. Several low sorts, not entirely disagreeable, are raised

in great plenty, and sold at a very cheap rate; so that the sailors of the East-India ships commonly indulge themselves very plentifully in them whenever they come ashore.

"The products of the country supply with provisions the ships of all nations which touch at the Cape. Corn, flour, biscuit, salted beef, brandy, and wine, are to be had in abundance, and at moderate prices; and their fresh greens, fine fruits (c), good mutton and beef, are excellent restoratives to seamen who have made a long voyage."

HOTTINGER (John Henry), born at Zurich in Switzerland in 1620, professed the Oriental languages at Leyden, and was esteemed by all his learned colleagues. He was drowned, with part of his family, in the river Lemit, in the year 1667. He wrote a prodigious number of works; the principal of which are, 1. *Exercitationes Anti-Morinianæ de Pentateucho Samaritano*, quarto, in which he defends the Hebrew text against father Morin. 2. *Historia Orientalis*, quarto. 3. *Bibliothecarius quadripartitus*. 4. *The-saurus Philologicus Sacre Scripture*, quarto. 5. *Historia Ecclesiastica*. 6. *Promptuarium, sive Bibliotheca Orientalis*, 4to. 7. *Dissertationes miscellaneæ*, &c.

HOTTONIA, WATER-VIOLET; a genus of the monogynia order, belonging to the pentandria class of plants.—There is but one species, viz. the palustris, with a naked stalk. It grows naturally in the standing waters in many parts of England. The leaves, which are for the most part immersed in water, are finely winged and flat like most of the sea-plants; and at the bottom have long fibrous roots, which strike into the mud: the flower-stalks rise or five six inches above the water, and toward the top have two or three whorls of purple flowers, terminated by a small cluster of the same. These flowers have the appearance of those of the stock-gillflower, so make a pretty appearance on the surface of the water.—It may be propagated in deep standing waters, by procuring its seeds when they are ripe, from the places of their natural growth; which should be immediately dropped into the water in those places where they are designed to grow, and the spring following they will appear; and if they are not disturbed, they will soon propagate themselves in great plenty.—Cows eat this plant; swine refuse it.

HOVEDEN (Roger de), born of an illustrious family, became chaplain to king Henry II. and left behind him two books of *English Annals*, carried on from the year 732, where Bede ended, to the 4th of king John, 1201. Sir H. Savile and Mr. Selden reckon him among the most considerable historians who flourished in the 11th and 12th centuries.

HOULIERES (Antoinette de), a French lady, whose poetry is highly esteemed in France. Her works and those of her daughter have been collected and printed together in two volumes. Most of the Idyls, particularly those on sheep and birds, surpass every thing of the kind in the French language: the thoughts and expressions are noble; and the style pure, flowing, and chaste. Mademoiselle des Houlières carried the poetic prize in the French academy against Fontenelle. Both of these ladies were members

Hottin
Houlières

(a) A league contains about 108 gallons, or a pipe.

(c) Their grapes and oranges are some of the best in the world.

Hound,
Hours.

bers of the academy of Ricovatri; the mother was also a member of the academy of Arles.—Those who desire to be more particularly acquainted with the history of Madam des Houlieres may consult her life prefixed to her works in the Paris edition of 1747, 2 vols 12mo.

HOULSWORTHY, a large town of Devonshire, seated between four branches of the river Tamer, having a good market for corn and provisions. W. Long. 4. 42. N. Lat. 50. 50.

HOUND. See **CANIS**, **BLOOD-HOUND**, and **GRE-HOUND**.

HOURLY, in chronology, an aliquot part of a natural day, usually a 24th, but sometimes a 12th. The origin of the word *hora*, or *ura*, comes, according to some authors, from a surname of the sun, the father of hours, whom the Egyptians call *Horus*. Others derive it from the Greek *ὥριον*, to terminate, distinguish, &c. Others from the word *ουρα*, urine; holding, that Trismegistus was the first that settled the division of hours, which he did from observation of an animal consecrated to Serapis, named *cynocephalus*, which makes water 12 times a-day, and as often in the night, at equal intervals.

An hour, with us, is a measure or quantity of time, equal to a 24th part of the natural day, or nycthemeron; or the duration of the 24th part of the earth's diurnal rotation. Fifteen degrees of the equator answer to an hour; though not precisely, but near enough for common use. It is divided into 60 minutes; the minute into 60 seconds, &c.

The division of the day into hours is very ancient: as is shewn by Kircher, *Oedip. Egypt.* Tom. II. P. II. class. VII. c. 8.: though the passages he quotes from Scripture do not prove it.—The most ancient hour is that of the 12th part of the day. Herodotus, lib. ii. observes, that the Greeks learnt from the Egyptians, among other things, the method of dividing the day into twelve parts.—The astronomers of Cathaya, &c. bishop Beveridge observes, still retain this division. They call the hour, *chag*; and to each *chag* give a peculiar name, taken from some animal: The first is called *zeth*, "mouse;" the second, *chiu*, "bullock;" the third, *zem*, "leopard;" the fourth, *mau*, "hare;" the fifth, *chiu*, "crocodile, &c."

The division of the day into 24 hours, was not known to the Romans before the first Punic war.—Till that time they only regulated their days by the rising and setting of the sun. They divided the 12 hours of their day into four, viz. *prime*, which commenced at six o'clock; *third*, at nine; *sixth*, at twelve, and *nones*, at three. They also divided the night into four watches, each containing three hours.

HOURS, **Horæ**, in the ancient mythology, were certain goddesses, the daughters of Jupiter and Themis; at first only three in number, Eunomia, Dice, and Irene; to which were afterwards added two more, Carpo and Thallo.—Homer makes them the door-keepers of heaven. Ovid allots them the employment of harnessing the horses of the sun:

Jungere equos Titan velocibus imperat Horis.

HOURS, **Horæ**, in the Romish church, are certain prayers performed at stated times of the day; as matins, vespers, lauds, &c.—The lesser hours, are *prime*,

tierce, *sixth*, and *nones*. They are called *hours*, or *canonical hours*, as being to be rehearsed at certain hours prescribed by the canons of that church, in commemoration of the mysteries accomplished at those hours. These hours were anciently also called *cours*, *curfus*; F. Mabillon has a dissertation on them, entitled, *De Curfu Gallicano*.

The first constitution enjoining the observation of the canonical *hours*, is of the ninth century, being found in a capitular of Heito bishop of Basil directed to his curates, importing that the priests shall never be absent at the canonical hours either by day or night.

HOUSE, a habitation, or place built with conveniences for dwelling in. See **ARCHITECTURE**.

HOUSE is also used for one of the estates of the kingdom assembled in parliament. Thus we say, the house of lords, the house of commons, &c. See **PEERS**, **COMMONS**, &c.

HOUSE is also used for a noble family; or a race of illustrious persons issued from the same stock. In this sense we say, the house or family of the Stuarts, the Bourbons, the house of Hanover, of Austria, of Lorraine, of Savoy, &c.

Cheap, easy, and expeditious Method of constructing Houses, which have been found to be very useful hospitals for the recovery of the sick, and therefore may probably make very wholesome places of residence for the healthy.—The first thing to be done is to choose a dry and airy situation, on a gravelly or chalky soil if possible; upon this lay down the plan of your building, making one end of it face that quarter from whence the purest and healthiest winds may be expected to blow, of a breadth that can be conveniently roofed. Then, if boarding does not come so cheap, drive stakes, at about six feet distance from each other, into the ground, so as to stand about six feet above it; and, interlacing them with wattles, coat the wattles on the side next the weather, with fresh straw; and make the roof in the same manner, but thicker, or of thatch in the usual way, with a hole at the very top of it, to open occasionally. Let the end of the building facing the wholesomest quarter lie open some feet back, so as to form a porch, where the convalescents may take the air without danger of any injury from the weather. A large chimney and kitchen grate may be erected at the other end. If the soil happens to be chalky or gravelly, you may hollow it four or five feet deep, within a foot or eighteen inches of the walls; but let the steps into this hollow lie far enough within the porch, that no water may get into it, and, if of chalk, the steps may not grow slippery in wet weather. From time to time open the vent-hole at the roof; by means of which all the unwholesome infectious air, as being warmer, and consequently lighter, than that which is pure and wholesome, will be driven out by the rushing in of the fresh air: a purpose, which the little openings, that may be left in the sides and roofs of such rude and hasty buildings, will, even of themselves, answer so well, as sufficiently to compensate any cold they may let in, even in the coldest months. Let the floor likewise be scraped three or four inches deep every five or six days, and what comes off removed to some distance. Halls of this kind, 50 feet long and 20 broad, cost but a trifle to build; yet,

with

with these precautions (even without the addition of clean straw for every new patient to lie on, inclosed in clean washed sacks fit for the purpose, which come infinitely cheaper than the bare cleaning of flock or even feather beds, supposing it possible to clean such beds), proved of infinitely more advantage in the recovery of sick soldiers, than the low-roofed rooms of the farm-houses of the Isle of Wight, or even the better accommodations of Carisbrooke castle in the same island, in which there prevailed four times the number of sick that there did in these temporary receptacles; which were first thought of by doctor Procklesby, on occasion of some terrible infections from confined animal-effluvia.

Is it not surprising, that we have not availed ourselves more of the above discovery in natural history, being, perhaps, the most important the moderns can boast of, in the most useful science, viz. the superior lightness of unwholesome and infectious air! The upper salhes in most houses, even of those who pretend to some knowledge in these matters, are generally immovable, by means of which no part of the foul air above the level of the lowest rail of the other salh's greatest rise, can escape by the window; and, if it escapes by the doors, it is generally for want of a vent in the highest part of the roof, merely to accumulate in the upper story of the house, and add to the infection, which the great quantities of old furniture usually stored up there are of themselves but too apt to create, when care is not frequently taken to open the windows of it. Thus, the chief benefit to be expected from lofty rooms is in a great measure lost. Whereas, were the upper salhes contrived to come down, all the air might be easily changed, and that almost insensibly, by letting them down an inch or two. Nay, the upper salh might be often let entirely down with less danger or inconvenience from cold, than the lower thrown up the tenth part of an inch, though the doing of the former would be attended with infinitely more advantage to the health of the inhabitants than the latter. It is, perhaps, on this principle, that we are to account for the good health enjoyed by the poor who live crowded in damp cellars, and often with great numbers of rabbits, poultry, and even swine about them. These cellars are open to the street, with doors reaching from the floor to the very ceiling, but never so close at bottom or at top as to prevent a free circulation of air; in consequence of which, that all-vivifying fluid, as fast as it is spoiled by passing through the lungs of the inhabitants and their stock, or is infected by their insensible perspiration, excrements, &c. is driven out and replaced by the fresh air.

HOUSE, in astrology, denotes the twelfth part of the heavens.

The division of the heavens into houses, is founded upon the pretended influence of the stars, when meeting in them, on all sublunary bodies. These influences are supposed to be good or bad; and to each of these houses particular virtues are assigned, on which astrologers prepare and form a judgment of their horoscopes. The horizon and meridian are two circles of the celestial houses, which divide the heavens into four equal parts, each containing three houses; six of which are above the horizon, and six below it; and six of these

are called *eastern*, and six *western houses*.

A scheme or figure of the heavens is composed of 12 triangles, also called *houses*, in which is marked the stars, signs, and planets, so inclosed in each of these circles. Every planet has likewise two particular houses, in which it is pretended that they exert their influence in the strongest manner; but the sun and moon have only one, the house of the former being Leo, and that of the latter Cancer.

The houses in astrology have also names given them according to their qualities. The first is the house of life: this is the ascendant, which extends five degrees above the horizon, and the rest below it. The second is the house of riches: the third, the house of brothers: the fourth, in the lowest part of the heavens, is the house of relations, and the angle of the earth: the fifth, the house of children: the sixth, the house of health: the seventh, the house of marriage, and the angle of the west: the eighth, the house of death: the ninth, the house of piety: the tenth, the house of offices: the eleventh, the house of friends: and the twelfth, the house of enemies.

Country-House, is the *villa* of the ancient Romans, the *quinta* of the Spaniards and Portuguese, the *closerie* and *cassine* of the French, and the *vigna* of the Italians.

It ought always to have wood and water near it; these being the principal beauties of a rural seat. The trees make a far better defence than hills, as they yield a cooling and healthy air, shade during the heat of summer, and very much break the severities of the winter season.

It should not be situated too low, on account of the moisture of the air; and, on the other hand, those built on places exposed to the winds are expensive to keep in repair. In houses not above two stories high, and upon a good foundation, the length of two bricks, or 18 inches, for the heading course, will be sufficient for the ground-work of any common structure; and six or seven courses above the earth, to a water-table; where the thickness of the walls are abated, or taken in, on either side the thickness of a brick, viz. two inches and a quarter. But for large and high houses of three, four, or five stories, with garrets, their walls ought to be three heading courses of bricks, or 28 inches at least, from the foundation to the first water-table; and at every a story a water-table, or taking in, on the inside, for the summers, girders, and joists to rest upon, laid into the middle, or one quarter of the wall at least, for the better bond. But as for the partition-wall, a brick and half will be sufficiently thick; and for the upper stories, a brick length or nine inch brick will suffice.

HOUSE-Breaking, or *Robbing*, is the breaking into and robbing a house in the day-time; the same crime being termed *BURGLARY*, when done by night: both are felony, without benefit of clergy.

HOUSEHOLD, the whole of a family considered collectively, including the mistress, children, and servants. But the household of a sovereign prince includes only the officers and domestics belonging to his palace.

The principal officers of his majesty's household are, the lord steward, lord chamberlain of the household, the groom of the stole, the master of the great wardrobe,

Household. robe, and the master of the horse.

The civil government of the king's house is under the care of the lord steward of the king's household; who, as he is the chief officer, all his commands are observed and obeyed. His authority extends over all the other officers and servants, except those of his majesty's chapel, chamber, and stable, and he is the judge of all crimes committed either within the court or the verge.

Under him are the treasurer of the household, the comptroller, cofferer, the master of the household, the clerks of the green-cloth, and the officers and servants belonging to the accounting-house, the marshalsea, the verge, the king's kitchen, the household kitchen, the acatery, bake-house, pantry, buttery, cellar, pastry, &c. Next to the lord steward is the lord chamberlain of the household, who has under him the vice-chamberlain, the treasurer, and comptroller of the chamber; 48 gentlemen of the privy chamber, 12 of whom wait quarterly, and two of them lie every night in the privy-chamber; the gentleman usher, the grooms of the great chamber, the pages of the presence-chamber; the mace-bearers, cup-bearers, carvers, musicians, &c. See *LORD CHAMBERLAIN of the Household*.

The groom of the stole has under him the 11 other lords of the bed-chamber, who wait weekly in the bed-chamber, and by turns lie there a-nights on a pallet-bed; and also the grooms of the bed-chamber, the pages of the bed-chamber and back-stairs, &c. See *Groom of the Stole*.

The master or keeper of the great wardrobe has under him a deputy, comptroller, clerk of the robes, brusher, &c. and a number of tradesmen and artificers, who are all sworn servants to the king.

The master of the horse has under his command the equerries, pages, footmen, grooms, coachmen, farriers, saddlers, and all the other officers and tradesmen employed in his majesty's stables.

Next to the civil list of the king's court, is the military, consisting of the band of gentlemen pensioners, the yeomen of the guard, and the troops of the household; of which the two first guard the king above stairs.

When the king dines in public, he is waited upon at table by his majesty's cup-bearers, carvers, and gentlemen sewers; the musicians playing all the time. The dinner is brought up by the yeomen of the guard, and the gentlemen sewers set the dishes in order. The carvers cut for the king, and the cup-bearers serve him the drink with one knee on the ground, after he has first tasted it in the cover.

House and Window Duty.—A branch of the king's extraordinary revenue *.—As early as the conquest mention is made in domesday book of fumage or fumage, vulgarly called *smoke-farthings*; which were paid by custom to the king for every chimney in the house. And we read that Edward the Black prince (soon after his successes in France) in imitation of the English custom, imposed a tax of a florin upon every hearth in his French dominions. But the first parliamentary establishment of it in England was by statute 13 & 14 Car. II. c. 10. whereby an hereditary revenue of 2s. for every hearth, in all houses paying to church and poor, was granted to the king for ever. And, by subsequent statutes, for the more regular assessment of this

tax, the constable and two other substantial inhabitants of the parish, to be appointed yearly, (or the surveyor appointed by the crown, together with such constable or other public officer) were, once in every year, empowered to view the inside of every house in the parish. But, upon the revolution, by stat 1. W. & M. c. 10. hearth-money was declared to be "not only a great oppression to the poorer sort, but a badge of slavery upon the whole people, exposing every man's house to be entered into and searched at pleasure, by persons unknown to him; and therefore, to erect a lasting monument of their majesties goodness, in every house in the kingdom the duty of hearth-money was taken away and abolished." This monument of goodness remains among us to this day: but the prospect of it was somewhat darkened, when in six years afterwards, by statute 7 W. III. c. 18. a tax was laid upon all houses (except cottages) of 2s. now advanced to 3s. *per* house, and a tax also upon all windows, if they exceeded nine, in such house. Which rates have been from time to time varied, being now extended to all windows exceeding six; and power is given to surveyors, appointed by the crown, to inspect the outside of houses, and also to pass through any house, two days in the year, into any court or yard to inspect the windows there.

HOUSING, or *HOUSE-LENE*, in the sea-language, a small line, formed of three fine strands, or twists of hemp, smaller than rope-yarn. It is chiefly used to seize blocks into their strops, to bind the corners of the sails, or to fasten the bottom of a sail to its bolt-rope, &c. See *BOLT-ROPE*.

HOWARD (*HENRY*), earl of Surry, a soldier and a poet, the son and grandson of two lord treasurers, dukes of Norfolk, was born probably about the year 1520, and educated in Windsor castle, with young Fitzroy, earl of Richmond, natural son to king H. VIII. Wood says, from tradition, that he was some time a student at cardinal college, Oxford. In his youth he became enamoured of the Fair Geraldine, whom his sonnets have immortalized. In 1532, Howard with his companion Richmond was at Paris, where they continued some time. The latter died in 1536; after which our young hero made a tour to Italy, and at Florence, like a true *amator*, published a challenge against all comers, whether Christians, Jews, Saracens, Turks, or cannibals, in defence of the beauty of his fair Geraldine; and was victorious in the tournament instituted by the grand duke on the occasion. The duke, we are told, was so charmed with his gallant exploits, that he would gladly have retained him at his court; but he rejected the invitation, being determined to maintain the superlative beauty of his Geraldine, in all the principal cities in Italy. This romantic resolution was however frustrated by the command of his sovereign, Henry VIII. to return to England.

In 1540, he signalized himself in a tournament at Westminster, against Sir John Dudley, Sir Thomas Seymour, and others. In 1542, he marched, under the command of his father, against the Scots; and in the same year was confined in Windsor castle for eating flesh in Lent, contrary to the king's proclamation. In 1544, on the expedition to Boulogne in France, he was appointed field-marshal of the English army; and after the taking of that town, in 1546, made captain-general.

Housing,
Howard.

Howard.

general of the king's forces in France. He was at this time knight of the garter. In the same year, attempting to intercept a convoy, he was defeated by the French, and soon after superseded in his command by the earl of Hertford.

Surry, after his return to England, conscious of his former services, and pensive under his disgrace, could not help reflecting on the king and council. This was his first step towards destruction. He had married Frances, the daughter of John earl of Oxford; and, after her death, is said to have made love to the princess Mary. For this the Seymours, rivals of the Norfolk family, and now in favour with the king, accused him of aspiring to the crown; adding, that he already presumed to quarter part of the royal arms with his own: but, whatever might be the pretence, the cause of his ruin was the jealousy and power of his enemies. In short, the destruction of the Howards being determined, Surry, and his father the duke of Norfolk, were committed to the tower, in December 1546; and on the 13th of January following, Surry was tried at Guild-hall by a common jury, and beheaded on Tower-hill on the 19th day of the same month, nine days before the death of the king, who thus, that the measure of his crimes might be full, finished his life with the murder of his best subject. The accusations brought against this amiable and innocent young nobleman on his trial, were so extremely ridiculous, that one is astonished how it was possible, even in the most despotic reign, to find a judge and jury so pusillanimously villainous as to carry on the farce of justice on the occasion. We boast of our excellent constitution, and our trial by juries; but this example may teach us, that our constitution and our juries are not incompatible with despotic monarchy. He was first interred in the church of All-hallows, Barkin, near Tower-hill; and afterwards, in the reign of king James I. removed to Farmingham in Suffolk, by his son Henry earl of Northampton.

As to the character of this unfortunate earl, all our poets have sung his praise. Mr Walpole begins his anecdotes of Surry with these words:—"We now emerge from the twilight of learning to an almost classic author, that ornament of a boisterous, yet not unpolished court, the earl of Surrey, celebrated by Drayton, Dryden, Fenton, Pope, illustrated by his own muse, and lamented for his unhappy death: a man (as Sir Walter Raleigh says), no less valiant than learned, and of excellent hopes." Leland calls him the conscript enroled heir of Sir Thomas Wyatt, the elder, in his learning and other excellent qualities; and the author of *The Art of English Poetry* says, that the earl of Surrey, and Sir Thomas Wyatt, may be justly called the reformers of our poetry and style. His poems were published in 1557, 12mo; and in 1565, 1574, 1585, 1587, 8vo. Several of the sonnets are by Sir Thomas Wyatt and others.

HOWARD (Charles), an able statesman and experienced seaman, was the son of lord William Howard, baron of Effingham, and born in 1536. He served under his father, who was lord high admiral of England, till the accession of queen Elizabeth. In January 1573, he succeeded his father in his title and estate: after which he successively became chamberlain of the household, and knight of the garter; and, in 1585, was

made lord high admiral, at that critical juncture when the Spaniards were sending their armada, in their opinion, to the assured conquest of this kingdom. When he received intelligence of the approach of the Spanish fleet, and saw the prodigious consequence it was to get out the few ships that were ready at Plymouth, he not only gave orders in every thing himself, but wrought also with his own hands, and the first night left the port with six ships. The next morning, though he had only 30 sail, and those the smallest of the fleet, he attacked the Spanish navy; but first dispatched his brother-in-law, Sir Edward Hobby, to the queen, to desire her to make the proper disposition of her land-forces for the security of the coast, and to hasten as many ships as possible to his assistance. His valour was conspicuously displayed in his repeated attacks of a superior enemy. The coolness of his temper was no less conspicuous; and it was owing to his magnanimity and prudence that the victory was so great. The queen expressed her sense of his merit in the most honourable terms; and granted him a pension for life. In 1596, he commanded in chief at sea, as Essex did by land, the forces sent against Spain, when his prudence and moderation were among the principal causes of the success the English met with in that great and glorious enterprise; so that, upon his return the next year, he was advanced to the dignity of earl of Nottingham. The next eminent service in which his Lordship was engaged was in 1599, when the Spaniards seemed to meditate a new invasion. Her majesty, who always placed her safety in being too quick for her enemies, drew together, in a fortnight's time, such a fleet, and such an army, as took away all appearance of success from her foreign and domestic enemies; and she gave the earl the sole and supreme command of both the fleet and army, with the title of *lord lieutenant general of all England*, an office unknown in succeeding times. When age and infirmity had unfitted him for action, he resigned his office, and spent the remaining part of his life in ease and retirement, till the time of his decease, which happened in 1624, in the 87th year of his age.

HOWE (John), a learned English nonconformist divine born in 1630. He became minister of Great Torrington in Devonshire, and was appointed household chaplain to Cromwell; but seems to have been free from the fanaticism then in fashion, as he offended Cromwell greatly by preaching against the notion of particular faith which the ministers of his court were great advocates for. When Oliver died, he continued chaplain to Richard; and when Richard was deposed, he returned to Torrington, where he continued till the act of uniformity took place and set him aside. He afterwards settled at Utrecht, until the declaration for liberty of conscience was published by king James II. under shelter of which he returned to London, where he died in 1705. He published a great number of sermons and religious works, which have been reprinted together in one volume folio.

Howe-Island, a small island of the South Sea, discovered by Captain Wallis, called by the inhabitants of the Society-Island *Mopeha*; lies in S. Lat. 16. 46. and W. Long. 154. 8.

HOWEL (James), a voluminous writer of the 17th century, supported himself many years by writing and translating

Howard.

Howe.

translating of books. Though he had been a zealous loyalist, he afterwards flattered Cromwell; yet on the restoration he was made historiographer to the king, being the first in England who enjoyed that title. He died in 1666.

HOWITZ, a kind of mortar, mounted upon a field-carriage like a gun. The difference between a mortar and a howitz is, that the trunnions of the first are at the end, and at the middle in the last. The invention of howitzes is of much later date than mortars, for they really had their origin from them. The constructions of howitzes are as various and uncertain as those of mortars, excepting the chambers, which are all cylindric. They are distinguished by the diameter of the bore; for instance, a ten inch howitz is that the diameter of which is 10 inches; and so of the smaller ones.

HOY, a small vessel, chiefly used in coasting, or carrying goods to or from a ship, in a road or bay, where the ordinary lighters cannot be managed with safety or convenience.

It would be very difficult to describe, precisely, the marks of distinction between this vessel and some others of the same size, which are also rigged in the same manner; because what is called a *hoy* in one place, would assume the name of a *sloop* or *snack* in another; and even the people who navigate these vessels, have, upon examination, very vague ideas of the marks by which they are distinguished from those abovementioned. In Holland, the hoy has two masts; in England, it has but one, where the main-mast is sometimes extended by a boom, and sometimes without it. Upon the whole, it may be defined a small vessel, usually rigged as a sloop, and employed for carrying passengers and luggage from one place to another, particularly on the sea-coast.

Hov, an island of Scotland, and one of the Orades. It is about 10 miles long; and that part called *Haes* is fruitful and pretty populous, and is a good place for fishing.

HOYE, a town of Germany, in Westphalia, and capital of a county of the same name. It is seated on the river Weser, and is subject to the elector of Hanover. E. Long. 9. o. N. Lat. 53. 5.

HUAHINE, one of the *Society-Islands*, in the South Sea, situated in S. Lat. 16. 43. W. Lon. 150. 52. and is about seven or eight leagues in compass. Its surface is hilly and uneven, and it has a safe and convenient harbour. It was first discovered by Captain Cook in 1769. It is divided by a deep inlet into two peninsulas connected by an isthmus, which is entirely overflowed at high water. From the appearance of its hills it may be concluded, that the country has at some period or other been the seat of a volcano. The summit of one of them had much the appearance of a crater, and a blackish spongy earth was seen upon one of its sides, which seemed to be lava; and the rocks and clay every where had a burnt appearance. The island is plentifully supplied with water by many rivulets which descend from the mountains and broken rocks. The inhabitants are nearly as fair as Europeans; and their conduct is bolder than that of the inhabitants of the other Society Islands. They are a stout large-made people, some of the tallest being six feet three inches in height; they are extremely indolent, and seem to have as little curiosity as fear. The dogs, however, in spite of their stupidity, are in great favour with all their

Vol. V.

women, "who could not have cared for them (says Mr Forster) with a more ridiculous affection if they had been European ladies of fashion." Here was seen a middle-aged woman, whose breasts were full of milk, offering them to a little puppy who had been trained up to suck them. The sight disgusted those who saw it so much, that they could not forbear expressing their dislike to it; but the woman smiled, and told them that she allowed young pigs to do the same. It appeared afterwards that this woman had lost her child. Some of the gentlemen were present at a dramatic entertainment on this island: the piece represented a girl running away from her parents; and seemed to be levelled at a female passenger who had come in Captain Cook's ship from O'Tahitee, and who happened to be present at the representation. It made such an impression on the girl, that the gentlemen could scarce prevail upon her to see the piece out, or to refrain from tears while it was acting. It concluded with the reception she was supposed to meet with from her friends, which was made out not to be a very agreeable one.—These people introduce extempore pieces upon occasion; and it is most probable that this was meant as a satire upon the girl abovementioned, and to discourage others from acting in the same manner.

HUBER (Ulric), one of the greatest civilians in the 17th century, was born at Dockum in 1636. He became professor of law at Franeker; and wrote, 1. *A treatise De jure civitatis*. 2. *Jurisprudentia Frisica*. 3. *Specimen philosophiæ civilis*. 4. *Institutiones historiciæ civilis*; and several other works which are esteemed. He died in 1694.

HUBERT (St), a town of the Netherlands, on the confines of Liege, with a very fine abbey, where they bring those that are bit by mad animals to be cured. E. Long. 5. 25. N. Lat. 34. 32.

HUBNER (John), a learned geographer of Germany, taught geography at Leipzig and Hamburg with extraordinary reputation; and died at Hamburg in 1732, aged 63. His principal work is *A Geographical treatise*, printed at Basil in 1746, in 6 vols 12mo.

HUDSON (Jeffery). See DWARF.

HUDSON (Henry), an eminent English navigator, who, about the beginning of the last century, undertook to find out a passage by the north-east or north-west to Japan and China. For this purpose he was four times fitted out: he returned three times unsuccessful; but in the last voyage, in 1610, being persuaded that the great bay to which his name has been since given, must lead to the passage he sought, he wintered there, to prosecute his discovery in the spring. But their distresses during the winter producing a mutiny among his men, when the spring arrived, they turned him, with his son and seven sick men, adrift in his own shallop, and proceeded home with the ship. As Hudson and his unhappy companions were never heard of afterward, it is to be supposed they all perished.

HUDSON (John), a very learned English critic, born in 1662. He distinguished himself by several valuable editions of Greek and Latin authors; and, in 1701, was elected head keeper of the Bodleian library at Oxford. In 1712, he was appointed principal of St Mary's Hall, through the interest of the famous Dr Ratcliffe: and it is said that the university

Hudson's
Bay.

of Oxford is indebted for the most ample benefactions of that physician to Dr Hudson's solicitations. He died in 1719, while he was preparing for publication a catalogue of the Bodleian library, which he had caused to be fairly transcribed in six folio volumes.

Hudson's Bay, a large bay of North America, lying between 51 and 69 degrees of latitude, discovered in 1610 by Henry Hudson. This intrepid mariner, in searching after a north-west passage to the South-seas, discovered three streights, through which he hoped to find out a new way to Asia by America. He sailed boldly into the middle of the new gulph, and was preparing to explore all its parts, when his treacherous crew put him into the long-boat, with seven others, and left him, without either arms or provisions, exposed to all the dangers both of sea and land. The barbarians, who refused him the necessaries of life, could not, however, rob him of the honour of the discovery; and the bay, which he first found out, will ever be called by his name.

Royal.

The miseries of the civil war which followed soon after, had, however, made the English forget this distant country, which had nothing to attract them. A succession of more quiet times had not yet induced them to attend to it; when Groseillers and Radisson, two French Canadians, having met with some discontent at home, informed the English, who were engaged in repairing the mischiefs of discord by trade, of the profits arising from furs, and of their claim to the country that furnished them. Those who proposed this undertaking shewed so much ability, that they were intrusted with the execution of it; and the first establishment they formed succeeded so well, that it surpassed their own hopes as well as their promises.

This success alarmed the French; who were afraid, and with reason, that most of the fine furs which they got from the northern parts of Canada would be carried to Hudson's bay. Their alarms were confirmed by the unanimous testimony of their *Coureur de Bois*, who, since 1656, had been four times as far as the borders of the streight. It would have been an eligible thing to have gone by the same road to attack the new colony; but the distance being thought too considerable, notwithstanding the convenience of the rivers, it was at length determined that the expedition should be made by sea. The fate of it was trusted to Groseillers and Radisson, who had been easily prevailed upon to renew their attachment to their country.

These two bold and turbulent men failed from Quebec in 1682, in two vessels ill equipped; and on their arrival, finding themselves not strong enough to attack the enemy, they were contented with erecting a fort in the neighbourhood of that they designed to have taken. From this time there began a rivalry between the two companies, one settled at Canada, the other in England, for the exclusive trade of the bay, which was constantly kept up by the disputes it occasioned; till at last, after each of their settlements had been frequently taken and recovered, all hostilities were terminated by the treaty of Utrecht, by which the whole was ceded to Great-Britain.

Hudson's Bay, properly speaking, is only a mart for trade. The severity of the climate having destroyed all the corn sown there at different times, has frustrated every hope of agriculture, and consequently

of population. Throughout the whole of this extensive coast, there are not more than ninety or a hundred soldiers, or factors, who live in four bad forts, of which York-fort is the principal. Their business is to receive the furs brought by the neighbouring savages in exchange for merchandise, of which they have been taught the value and use.

Though these skins are much more valuable than those which are found in countries not so far north, yet they are cheaper. The savages give to beaver-skins for a gun, two for a pound of powder, one for four pounds of lead, one for a hatchet, one for six knives, two for a pound of glass-beads, six for a cloth-coat, five for a petticoat, and one for a pound of snuff. Combs, looking-glasses, kettles, and brandy, sell in proportion. As the beaver is the common measure of exchange, by another regulation as fraudulent as the first, two otters skins and three martins are required instead of one beaver. Besides this oppression, which is authorized, there is another which is at least tolerated, by which the savages are constantly defrauded in the quality, quantity, and measure of what is given them, and by which they lose about one third of the value.

From this regulated system of imposition, it is easy to guess that the commerce of Hudson's bay is a monopoly. The capital of the company that is in possession of it was originally no more than 10,565 *l.* and has been successively increased to 104,146 *l.* This capital brings them in an annual return of forty or fifty thousand skins of beavers or other animals, upon which they make so exorbitant a profit, that it excites the jealousy and clamours of the nation. Two thirds of these beautiful furs are either consumed in kind in the three kingdoms, or made use of in the national manufactures. The rest are carried into Germany, where the nature of the climate makes them a valuable commodity.

This bay is about ten degrees in breadth: the entrance is six leagues broad; but is only to be attempted from the beginning of July to the end of September, and is even then rather dangerous. This danger arises from mountains of ice, some of which are said to be from 15 to 18 hundred feet thick, and which, having been produced by winters of five or six years duration in little gulphs constantly filled with snow, are forced out of them by north-west winds, or by some other extraordinary cause. The best way of avoiding them is to keep as near as possible to the northern coast, which must necessarily be less obstructed and most free, by the natural directions of both winds and currents.

The north-west wind, which blows almost constantly in winter, and very often in summer, frequently raises violent storms within the bay itself, which is rendered still more dangerous by the number of shoals that are found there. Happily, however, small groups of islands are met with at different distances, which are of a sufficient height to afford a shelter from the storm. Beside these small archipelagoes, there are in many places large piles of bare rock. Except the alga marina, the bay produces as few vegetables as the other northern seas.

Throughout all the countries surrounding this bay, the sun never rises nor sets without forming a great cone of light: this phenomenon is succeeded by the Aurora Borealis, which tinges the hemisphere with coloured

Hudson's
Bay.

Hudson's-
River
||
Hue.

coloured rays of such a brilliancy, that the splendour of them is not effaced even by that of the full moon. Notwithstanding this, there is seldom a bright sky. In spring and autumn, the air is always filled with thick fogs, and in winter with an infinite number of small icicles. Though the heats in summer are pretty considerable for six weeks or two months, there is seldom any thunder or lightning.

One of the effects of the extreme cold or snow that prevails in this climate, is that of turning those animals white in winter which are naturally brown or grey. Nature has bestowed upon them all, soft, long, and thick furs, the hair of which falls off as the weather grows milder. In most of these quadrupeds, the feet, the tail, the ears, and, generally speaking, all those parts in which the circulation is slower because they are the most remote from the heart, are extremely short. Wherever they happen to be something longer, they are proportionally well covered. Under this gloomy sky, all liquors become solid by freezing, and break the vessels they are in. Even spirit of wine loses its fluidity. It is not uncommon to see fragments of large rocks loosened and detached from the great mass by the force of the frost. All these phenomena, common enough during the whole winter, are much more terrible at the new and full moon, which in these regions has an influence upon the weather, the causes of which are not known.

In this frozen zone, iron, lead, copper, marble, and a substance resembling sea-coal, have been discovered. In other respects, the soil is extremely barren. Except the coasts, which are for the most part marshy, and produce a little grass and some soft wood, the rest of the country affords nothing but very high moss, and a few weak shrubs very thinly scattered.

For an account of the inhabitants, see GREENLAND.

HUDSON'S-RIVER, a large river of North America, which rises on the east of Lake Ontario, and running by Albany, and on the back of the south part of New-England through part of New-York, falls into the bay of the sea beyond the west end of Long-Island, and below the town of New-York.

HUE and CRY, in law, the pursuit of a person who has committed felony on the high way.—Of this custom, which is of British origin, the following deduction is given by Mr Whitaker. "When it was requisite for the Britons to call out their warriors into the field, they used a method that was particularly marked by its expeditiousness and decisiveness, and remains partially among us to this moment. They raised a cry, which was immediately caught up by others, and in an instant transmitted from mouth to mouth thro' all the region. And, as the notice passed along, the warriors snatched their arms, and hurried away to the rendezvous. We have a remarkable description of the fact in Cæsar, and there see the alarm propagated in 16 or 17 hours through 160 miles in a line. And the same practice has been retained by the Highlanders to our own time. When the lord of a clan received intelligence of an enemy's approach, he immediately killed a goat with his own sword, dipped the end of a half-burnt stick in the blood, and then gave it and the notice of the rendezvous to be carried to the next hamlet. The former symbolically threatened fire and sword to all his followers that did not

instantly repair to the latter. The notice was dispatched from hamlet to hamlet with the utmost expedition. And in three or four hours the whole clan was in arms, and assembled at the place appointed. This was within these few years the ordinary mode by which the chieftains assembled their followers for war. The first person that received the notice, set out with it at full speed, delivered it to the next that he met, who instantly set out on the same speed, and handed it to a third. And, in the late rebellion of 1745, it was sent by an unknown hand through the region of Braidalbin; and, flying as expeditiously as the Gallick signal in Cæsar, traversed a tract of 32 miles in three hours. This quick method of giving a diffusive alarm is even preserved among ourselves to the present day; but is applied, as it seems from Cæsar's account above to have been equally applied among the Cæltæ, to the better purposes of civil polity. The *hustium* and clamour of our laws, and the *hue and cry* of our own times, is a well-known and powerful process for spreading the notice and continuing the pursuit of any fugitive felons. The cry, like the clamour of the Gauls or the summons of the Highlanders, is taken from town to town and from county to county; and a chain of communication is speedily carried from one end of the kingdom to the other.

HUESCA, an ancient and considerable town of Spain, in the kingdom of Arragon, with a bishop's see and an university. It is seated on the Huëla in a soil producing excellent wine, in W. Long. o. 13. N. Lat. 40. 2.

HUESCAR, or GUESCAR, a town of Spain in the kingdom of Granada, seated on a plain in W. Long. 1. 45. N. Lat. 37. 32.

HUESNE, or HUENA, a small island in the Baltic Sea, in the Sound, where was the famous observatory of Tycho Brahe. E. Long. 13. 5. N. Lat. 55. 54.

HUET (Peter Daniel), a very learned French writer, born at Caen in Normandy, on the 8th of February 1630. He discovered, from his infancy, a great inclination to the study of polite literature and the sciences, and at first applied himself to the law; but Des Cartes's principles, and Bochart's sacred geography, made him change his studies for those of philosophy, mathematics, the languages, and antiquities. His admiration for Bochart made him desirous of knowing him. He contracted a very strict friendship with him, and accompanied that learned man to Sweden. Here Christina would have engaged him in her service; but he, sensible of her inconstant temper, returned to France. All he brought with him was a copy of a MS. of Origen, which he transcribed at Stockholm. He refused several offers from Christina after she abdicated and went to Rome, and from Gustavus her successor. In 1670, Mr Bossuet being appointed by the king preceptor to the dauphin, his majesty chose Mr Huet for his colleague, with the title of *sub-preceptor to the prince*. It was he that formed the plan of the commentaries in *usum Delphini*, and directed the execution. His sentiments of piety determined him to enter into holy orders, which he did at the age of 46. Soon after this, he was presented by the king to the abbey of Aunay; and in 1685 was nominated to the bishopric of Soissons, which

Huesca
||
Huet.

Hughes
Huguenots.

he exchanged for the see of Avranches. After governing that diocese ten years, he resigned, and was made abbot of Fontenay near Caen. His love to his native place determined him to fix there. But lawsuits coming upon him, he retired to Paris, and lodged among the Jesuits in the *Maison Professe*, whom he had made heirs to his library. A severe distemper weakened his body extremely, but not the vivacity of his genius: he wrote his own life in a very elegant style; and died in 1721, aged 91. He was a man of very agreeable conversation; and of great probity, as well as immense erudition.—The following are the titles of his principal works. 1. *De Claris interpretibus, et de optimo genere interpretandi*. 2. An edition of Origen's commentaries on the holy Scriptures, in Greek and Latin. 3. A treatise on the origin of the Romans. 4. *Demonstratio evangelica*, folio. 5. *Quæstiones Aletane de concordia rationis et fidei*. 6. Of the situation of the terrestrial paradise, in French. 7. A history of the commerce and navigation of the ancients, which has been translated into English. 8. *Commentarius de rebus ad eam pertinentibus*. 9. *Huetiana*. 10. Latin and Greek verses, &c.

HUGHES (John), an ingenious and polite writer, was born in 1677. In the earliest parts of his youth he cultivated the sister-arts, poetry, drawing, and music, in each of which he by turns made a considerable progress; but followed those and his other studies only as agreeable amusements, under frequent confinement on account of his ill state of health. The lord Chancellor Cowper made him secretary for the commissions of the peace without his knowledge, and distinguished him with singular marks of his esteem. He continued in the same employment under the earl of Macclesfield, and held it to the day of his death; which happened in 1719, the very night in which his tragedy, intitled *The siege of Damascus*, was first acted. He was then 42. He translated Fontenelle's dialogues of the dead, Vertot's revolutions of Portugal, and the letters of Abelard and Eloisa. He gave a very accurate edition of Spencer's works, with his life, a glossary, and remarks; and wrote several papers in the *Tatler*, *Spectator*, and *Guardian*. Mr Duncombe, who married his sister, collected his poems and essays in 2 vols 12mo, in 1735.

HUGHLY, a town of Asia, in the kingdom of Bengal, seated on the most westerly branch of the river Ganges. It is of large extent, reaching about two miles along the river-side, and drives a great trade in all the commodities of that country; affording rich cargoes for 50 or 60 ships annually, besides what is brought on carriages to the neighbouring towns. Saltpetre is brought hither from Patna in vessels above 50 yards long and five broad. The inhabitants are chiefly Indians; but there are also Portuguese, English, and other Europeans. E. Long. 87. 55. N. Lat. 22. 0.

HUGO CAPET, chief of the third race of the kings of France, being count of Paris and Orleans: he was raised to the throne for his military valour and public virtues in 987. See FRANCE, n° 27.

HUGUENOTS, a name given by way of contempt to the Calvinists of France.

The name had its rise in the year 1560; but au-

thors are not agreed as to its origin. The most plausible opinion, however, is that of Pasquier, who observes, that at Tours, the place where they were first thus denominated, the people had a notion, that an apparition or hobgoblin, called king *Hugon*, strolled about the streets in the night-time; from whence, as those of the reformed religion met chiefly in the night to pray, &c. they called them *Huguenots*, that is, the disciples of king *Hugon*.

HULK, on old ship of war, fitted with an apparatus, to fix or take out the masts of his majesty's ships, as occasion requires. See Plate CLXI. fig. 7.

The mast of this vessel is extremely high, and withal properly strengthened by *sprouds* and *stays*, in order to secure what are called the *sheers*, which serve, as the arm of a crane, to hoist out or in the masts of any ship lying alongside. The sheers are composed of several long masts, whose heels rest upon the side of the hulk, and having their heads declining outward from the perpendicular, so as to hang over the vessel whose masts are to be fixed or displaced. The tackles, which extend from the head of the mast to the sheer-heads, are intended to pull in the latter towards the mast-head, particularly when they are charged with the weight of a mast after it is raised out of any ship, which is performed by strong tackles depending from the sheer-heads. The effort of these tackles is produced by two capsterns, fixed on the deck for this purpose.

HULK, is also a name bestowed on any old vessel laid by as unfit for further service. It is probably derived from the *οὐκαλῆς*, or vessels of burden, of the ancient Grecians.

HULL, in the sea-language, is the main body of a ship, without either masts, yards, sails, or rigging. Thus, *to strike a hull* in a storm, is to take in her sails, and to lash the helm on the lee-side of the ship; and *to hull*, or *lie a-hull*, is said of a ship whose sails are thus taken in, and helm lashed a-lee.

HULT, in geography. See KINGSTON upon Hull.

HUMAN, in general, is an appellation given to whatever relates to mankind: thus we say, the human soul, human body, human laws, &c.

HUMANITY, the peculiar nature of man, whereby he is distinguished from all other beings.

HUMANITIES, in the plural, signify grammar, rhetoric, and poetry, known by the name of *literæ humaniores*; for teaching of which, there are professors in the universities of Scotland, called *humanists*.

HUMBER, a river formed by the Trent, the Ouse, and several other streams united. It divides Yorkshire from Lincolnshire, and falls into the German Sea at Holderness.

HUME (David, esq.), a late celebrated philosopher and historian, was born in the fourth part of Scotland on the 26th of April O. S. in the year 1711. Being the younger son of a country gentleman of good family, but no great fortune, his patrimony was of consequence insufficient to support him. For this reason he was destined for the bar, and passed thro' his academical courses in the university of Edinburgh; but being more inclined to studies of a different nature, he never put on the gown, nor even took the introductory steps necessary for that purpose. The writings of Locke and Berkeley had directed the attention of

Hulk
Hume

Hume. of the generality of learned men towards metaphysics; and Mr Hume having early applied himself to studies of this kind, published in 1739 the two first volumes of his *Treatise of human nature*, and the third the following year. He had the mortification, however, to find his book generally decried; and to perceive, that the taste for systematic writing was now on the decline. He therefore divided this treatise into separate Essays and Dissertations, which he afterwards published at different times with alterations and improvements.

In 1742, Mr Hume published two small volumes, consisting of Essays moral, political, and literary. These were better received than his former publication; but contributed little to his reputation as an author, and still less to his profit; and his small patrimony being now almost spent, he accepted an invitation from the marquis of Anandale to come and live with him in England. With this nobleman he staid a twelvemonth, during which time his small fortune was considerably increased. He then received an invitation from General St Clair, to attend him as a secretary to his expedition, which was at first meant against Canada, but afterwards ended in an excursion against the coast of France. In 1747, he received an invitation from the general to attend him in the same station in his military embassy to the courts of Vienna and Turin. He then wore the uniform of an officer; and was introduced at these courts as aid-de-camp to the general, along with Sir Harry Erskine and captain Grant, afterwards general Grant. In 1749, he returned to Scotland, and lived two years with his brother at his country-house; where he composed the second part of his essays, called *Political Discourses*. And now the general approbation of his performances was indicated by a more extensive sale than formerly, and likewise by the numerous answers published by different persons in order to counteract their supposed pernicious tendency. In 1752, were published at Edinburgh his *Political Discourses*, the only work of his which was well received on its first appearance; and the same year, at London, his *Inquiry concerning the Principles of Morals*, which in his own opinion was incomparably the best of all his performances. This year also he was appointed librarian to the faculty of Advocates at Edinburgh; the principal advantage resulting from which employment was, that he had by that means the command of a large library. He then formed the plan of writing the *History of England*: but deeming the whole to be too extensive, he confined his history to that of Britain under the house of Stuart. The book was almost universally decried on its first appearance, and soon after seemed to sink in oblivion. Dr Herring, primate of England, and Dr Stone, primate of Ireland, were the only literati of the author's acquaintance who approved of the work, and sent him messages not to be discouraged.

Notwithstanding the approbation of these eminent men, however, Mr Hume's spirits were so much sunk by his bad success, that he had some thoughts of retiring to France, changing his name, and bidding adieu to his own country for ever; but his design was rendered impracticable by the breaking out of the war of 1755 between France and Britain. He then published his *Natural History of Religion*: to

which an answer was published, soon after its appearance, in the name of Dr Hurd, bishop of Litchfield and Coventry; of which, however, he hath since disclaimed being the sole author. In 1756, the second volume of the *History of the Stuarts* was published, two years after the appearance of the first. This was better received, and helped to retrieve the character of the former volume. Three years after, his *History of the House of Tudor* made its appearance; which was almost as ill received as the *History of the Stuarts* had been, the reign of Elizabeth being particularly obnoxious. The author, however, had now learned to despise popular clamours; and continued to finish at his leisure the more early part of the English history, which was published in 1761, and was received with tolerable success.

Mr Hume being now turned of fifty, and having obtained by the sale of his books a competent and independent fortune, retired into his native country of Scotland, determined never more to set his foot out of it. From this resolution, however, he was diverted by the earl of Hertford; whom he attended as secretary on his embassy to Paris in 1763. In 1765, the earl being appointed lord lieutenant of Ireland, Mr Hume was intrusted with the sole management of the business of the state till the arrival of the duke of Richmond towards the latter end of the year. In 1767, he returned to Edinburgh with a much larger income, procured to him by the earl of Hertford, than he formerly had; and now formed the same design he had formerly entertained, namely, of burying himself in his philosophical retreat. In this, however, he was again disappointed, by receiving an invitation from general Conway to be under secretary; and this invitation he was prevented from declining, both by the character of the person, and his connections with lord Hertford. In 1769, he returned to Edinburgh, possessed of L. 1000 a-year, healthy, and though somewhat stricken in years, yet having a prospect of long enjoying his ease, and of seeing the increase of his reputation. Of his last illness and character, he himself gives the following account. "In spring 1775, I was struck with a disorder in my bowels; which at first gave me no alarm, but has since, as I apprehend it, become mortal and incurable. I now reckon upon a speedy dissolution. I have suffered very little pain from my disorder; and what is more strange, have, notwithstanding the great decline of my person, never suffered a moment's abatement of my spirits; inso-much, that were I to name the period of my life which I should most chuse to pass over again, I might be tempted to point to this latter period. I possess the same ardour as ever in study, and the same gaiety in company. I consider, besides, that a man of sixty-five, by dying, cuts off only a few years of infirmities; and though I see many symptoms of my literary reputation's breaking out at last with additional lustre, I knew that I could have but few years to enjoy it. It is difficult to be more detached from life than I am at present.

"To conclude, historically, with my own character. I am, or rather was, (for that is the style I must now use in speaking of myself, which emboldens me the more to speak my sentiments); I was, I say, a man of mild dispositions, of command of temper, of an open,

Humerus
||
Humorus.

open, social, and cheerful humour, capable of attachment, but little susceptible of enmity, and of great moderation in all my passions. Even my love of literary fame, my ruling passion, never soured my temper, notwithstanding my frequent disappointments. My company was not unacceptable to the young and careless, as well as to the studious and literary; and as I took a particular pleasure in the company of modest women, I had no reason to be displeased with the reception I met with from them. In a word, though most men any wife eminent have found reason to complain of calumny, I never was touched, or even attacked, by her baleful tooth: and though I wantonly exposed myself to the rage of both civil and religious factions, they seemed to be disarmed in my behalf of their wonted fury. My friends never had occasion to vindicate any one circumstance of my character and conduct: not but that the zealots, we may well suppose, would have been glad to invent and propagate any story to my disadvantage, but they could never find any which they thought would wear the face of probability. I cannot say there is no vanity in making this funeral oration of myself, but I hope it is not a misplaced one; and this is a matter of fact which is easily cleared and ascertained."

His fears concerning the incurableness of his disorder proved too true. He died on the 25th of August 1776; and was buried in the Calton church-yard, Edinburgh, where a monument is erected to his memory.

HUMERUS, in anatomy. See **ANATOMY**, n° 48.
Luxation of the HUMERUS. See **SURGERY**.

HUMIDITY, that quality in bodies whereby they are capable of wetting other bodies. This differs very much from fluidity; and seems to be merely a relative thing, depending on the congruity of the component particles of the liquor to the pores of such particular bodies as it is capable of adhering to, penetrating a little into, or wetting. Thus, for instance, quicksilver is not a moist thing with regard to our hands or clothes; but may be called so in reference to gold, tin, or lead, to whose surfaces it will perfectly adhere, and render them soft and moist.

HUMILITY. See **MORALS**, n° 118.

HUMMING-BIRD. See **TROCHILUS**.

HUMOUR, in a general sense, denotes much the same with liquid or fluid. See **FLUID**.

HUMOUR. See **WIT**.

HUMPHREY (Dr Laurence), a very learned English divine in the 16th century, who, during the persecution under queen Mary, retired with other Protestant refugees to Zurich. He returned on the accession of queen Elizabeth; and was made president of Magdalene college, Oxford, dean of Gloucester, and then dean of Winchester. He was a great and general scholar, an able linguist, and a deep divine; and published, 1. *De religionis conservatione et reformatione, deque primatu regum*. 2. *De ratione interpretandi auctores*. 3. *Optimates; sive de nobilitate, ejusque origine*. 4. Sermons, and other works. He died in 1590.

HUMULUS, the **HOP**; a genus of the pentandria order, belonging to the diccæia class of plants. There is only one species, viz. the lupulus, which is sometimes found wild in hedges near houses and gardens,

but probably is not indigenous. The stalk is weak and climbing; it creeps up the support in a spiral, ascending always from the right hand to the left. The stalk and the leaves are rough to the touch: the upper leaves are heart-shaped, the lower ones divided into three lobes serrated on the edges, and grow in pairs on long footstalks. The male flowers grow on a distinct plant on branched peduncles; the females on peduncles in pairs of the form of a *Sporobolus* or cone, composed of large imbricated calyces containing each one or two seeds. For the culture and uses of hops, see the article **HOP**.

HUNDRED, **HUNDREDUM**, or *Centuria*, a part or division of a county; which was anciently so called from its containing an hundred families, or from its furnishing an hundred able men for the king's wars. After king Alfred's dividing this kingdom into counties, and giving the government of each county to a sheriff, these counties were divided into hundreds, of which the constable was the chief officer. The grants of hundreds were at first made by the king to particular persons: but they are not now held by grant or prescription, their jurisdiction being devolved to the county-court; a few of them only excepted, that have been by privilege annexed to the crown, or granted to some great subjects, and still remain in the nature of a franchise.

HUNDRED-COURT. This is only a larger **COURT-BARON**, being held for all the inhabitants of a particular hundred instead of a manor. The free suitors are here also the judges, and the steward the registrar, as in the case of a court-baron. It is likewise no court of record; resembling the former in all points, except that in point of territory it is of a greater jurisdiction. This is said by Sir Edward Coke to have been derived out of the county-court for the ease of the people, that they might have justice done them at their own doors, without any charge or loss of time: but its institution was probably co-eval with that of hundreds themselves, which were formerly observed to have been introduced tho' not invented by **ALFRED**, being derived from the polity of the ancient Germans. The *centeni*, we may remember, were the principal inhabitants of a district composed of different villages, originally in number an *hundred*, but afterwards only called by that name; and who probably gave the same denomination to the district out of which they were chosen. Cæsar speaks positively of the judicial power exercised in their hundred-courts and courts-baron, "*Principes regionum, atque pagorum*," (which we may fairly construe, the lords of hundreds and manors) "*inter suos jus dicunt, controversiasque minuunt*." And Tacitus, who had examined their constitution still more attentively, informs us not only of the authority of the lords, but that of the *centeni*, the hundredors, or jury; who were taken out of the common freeholders, and had themselves a share in the determination. "*Eliguntur in conciliis et principes, qui jura per pagos vicisque reddunt: centeni singulis, ex plebe comites, consilium simul et auctoritas adfunt*." This hundred-court was denominated *barreda* in the Gothic constitution. But this court, as causes are equally liable to removal from hence, as from the common court-baron, and by the same writs, and may also be reviewed by writ of false judgment, is therefore fallen into equal disuse

Hungary. diffuse with regard to the trial of actions.

HUNGARY, a kingdom of Europe, the greatest part of which was anciently called *Pannonia*. It had the name of *Hungary* from the Hunns, a Scythian or Tartar nation, who subdued it in the ninth century. It lies between the 18th and 22d degrees of east long. and betwixt the 45th and 49th degrees of north lat. being bounded to the north by the Carpathian mountains, which separate it from Poland; to the south by Servia, and the river Drave, which separates it from Slavonia; to the west by Moravia, Austria, and Stiria; and to the east by Walachia and Transylvania. It is about 240 miles in length, and 235 in breadth; and is divided into the Upper and Lower Hungary, the former being that part which lies towards the east, and the latter that which lies towards the west.

The northern parts of the kingdom are mountainous and barren, but healthy; the southern, on the contrary, are level, and exceeding fruitful, but not very healthy. The country along the Danube, from Preburg to Belgrade, for upwards of 200 miles, is one continued plain, and no soil can be more fertile; but the air, by reason of the many swamps and morasses, is not so wholesome as on the higher and drier grounds. Here are mines of gold, silver, copper, iron, lead, quicksilver, cinabar, antimony, yellow orpiment, sulphur, vitriol, marcasite, salt native and factitious, saltpetre, magnets, asbestos or stone-flax, marble of several colours, alabaster, with diamonds, and all sorts of precious stones. Corn is in such plenty, that it is sold for one sixth of its price in England. Their grapes are large and luscious; and their wines preferred to any in Europe. They have vast numbers of cattle and horses, the latter mostly mouse-coloured, with buffaloes, deer, wild-fowl, game, and fish, and many species of wild beasts, particularly chamois goats, bears, and lynxes. Of vegetables, besides vines, and the common sorts, here are tobacco, saffron, buck-wheat, millet, melons, and chefnuts. Here also are excellent warm baths, and springs of various kinds and qualities. The chief mountains of Hungary are the Crapack or Carpathian, which is the general name for all those that separate this kingdom from Poland, Moravia, Silesia, and some part of Austria. The sides of most of them are covered with wood, and their tops with snow. The chief rivers are the Danube, the Drave, the Save, the Wag or Waag, the Gran, the Teme, the Raab, and Theiss, all well stocked with fish. There are several lakes among the Carpathian mountains, and some also in the lowlands.

The inhabitants are a mixture of the descendants of the ancient Huns, Slavonians, Camani, Germans, Walachians, Greeks, Jews, Turks, and a wandering people called *Zigduns*, said to be of uncertain origin, but probably the same as those we call *gyffers*. The Hungarians are said to be of a sanguine choleric temper, and somewhat fierce, cruel, proud, and revengeful. They have been always reputed good soldiers, being much more inclined to arms, martial exercises, and hunting, than to arts, learning, trade, or agriculture. The nobility affect great pomp and magnificence, and are much addicted to feasting and carou-

ling. The men in general are strong and well proportioned. They shave their beards, but leave whifkers on the upper-lip; wearing fur caps on their heads, a close-bodied coat girt with a sash, with a short cloak or mantle over all, so contrived as to be buckled under the arm, and leave the right hand at liberty. Their horse are called *buffars*, and their foot *heydukes*. The former wear a broad-sword, or scymetar, and carry a hatchet or battle-ax. Their horses are fleet, but not near so large as the German horses, and therefore they stand up on their short stirrups when they strike. The heydukes usually wear feathers in their caps, according to the number of the enemies they pretend to have killed. Both horse and foot are an excellent militia, very good at a pursuit, or ravaging and plundering a country, but not equal to regular troops in a pitched battle. The women, when they go abroad, wear short cloaks and a veil.

There are four languages spoken in this country, viz. the Hungarian, which, like the people, is of Scythian origin, and has little or no affinity with any European tongue; the German, Slavonian, Wallachian, and Latin. The last is spoken, not only by the better sort, but also by the common people, though very corruptly. The people call *Zigduns* have also a particular jargon.—Christianity was planted in Hungary in the ninth and tenth centuries. In the sixteenth the reformation made a great progress in it; but at present, though the Roman-catholics hardly make a fourth part of the inhabitants, their religion is predominant, the Protestants enjoying only a bare toleration. Besides several sects of Protestants, there are also great numbers of the Greek church and Jews; the last pay double taxes of all kinds. Besides Jesuits colleges and other convents, there are several universities for the Roman-catholics. The Lutherans also and Calvinists have their gymnasia and schools, but under divers restrictions.

As to the traffic of this country, it is almost wholly in the hands of the Greeks and Jews. The exports consist chiefly of wine, horses, cattle, metals, minerals, saffron, wool, and leather. Hungary, in particular, furnishes Austria, and other countries west of it, with vast droves of cattle, as well as variety of excellent wines, of which those of Tokay are reckoned the best. The principal manufactures are those of copper, brass, iron, and other hard wares. Great quantities of brass and iron are exported, wrought and unwrought.

Hungary at first, like most other countries, was divided into many little principalities and states, which at length were united under one head, who had the title of *duke*. The last of these dukes was Geyfa: who, becoming a proselyte to Christianity, was baptized; after which he resigned the government to his son Stephen, who took the title of *king*, anno 1000. But as the throne was filled by election, though generally out of the same family, the disposal of the crown was disputed between the Turkish and German emperors for near 200 years: but after the year 1527, when Ferdinand archduke of Austria was advanced to the throne, the Austrians found means to influence the elections in such a manner, as to keep the crown in their

Hungary.

Hungary,
Hunger.

their family till 1687, when it was settled hereditarily on their heirs male; and now, in consequence of an act made by the diet at Presburg in 1723, in case of the failure of heirs-male, it is to descend to females. The states of the kingdom consist of the prelates, the barons, the gentry, and the royal towns. To the first class belong two archbishops, about a dozen bishops, near as many abbots and provosts, with the Pauline and Præmonstratensian Jesuits. To the second, the stadtholder or palatine, who represents the king; the court-judge; the ban or viceroy of Dalmatia, Croatia, and Slavonia; the Stadtholder of Transylvania; the great treasurer, the great cup-bearer, the steward of the household, the master of the horse, the lord chamberlain, the captain of the yeomen of the guards, and the grand-marshal of the courts, who are styled the great barons, together with the inferior bans or counts and barons. To the third class belong the gentry, some of whom have noble manors, and others only the privileges of nobles. To the fourth class belong the royal free cities, which are not subject to the counts, but hold immediately of the king. The gentry also, who hold of the archbishops and bishops, have the same privileges as the Hungarian nobility. The common people are vassals to the lords, on whose lands they live, whether these lands belong to the crown, the clergy, nobility, or gentry.

The ordinary revenue of this kingdom is said to exceed a million Sterling, arising from the mines, duties on cattle, royal demesnes, salt-works, contributions, customs, &c. The fortifications and garrisons constantly maintained on the frontiers, against the Turks, are a great expence to the government. Hungary can easily bring into the field 100,000 men, regulars and militia; for there are 50,000 in actual pay, and the provinces furnish the other 50,000 when they are wanted.

HUNGARY-Water, a distilled water prepared from the tops or flowers of rosemary; so denominated from a queen of Hungary, for whose use it was first made. See **PHARMACY**, n° 573.

HUNGER, an uneasy sensation occasioned by long abstinence from food when the body is in a healthy state.—Many speculations and conjectures have been formed concerning the cause of this sensation, but none of them in any degree satisfactory. The most ingenious and plausible is that of Dr Haller, viz. that as the liver is not then sustained by the stomach and intestines, it descends by its own weight, and, principally by means of its middle ligament, pulls the diaphragm along with it. It is in that place, therefore, that we have this uneasy sensation, and not at the superior orifice of the stomach as is generally thought.—But if this was the case, an empty stomach should always be accompanied with hunger, which does not hold in fact: because, in certain diseases, people will often fast a long time without any sensation of hunger; and on the contrary, there are cases where scarce any degree of repletion of the stomach and intestines can extinguish the desire of food. See (the *Index* subjoined to) **MEDICINE**.

When animals die for want of food, their death is not directly the consequence of hunger, *i. e.* it does not proceed from a deficiency of juices, but from a bad quality of them. The blood, being deprived of its

usual supplies of fresh chyle, contracts a putrescent disposition; from whence arises a fever of the putrid kind, and of a nature similar to the jail or hospital fever.

Preservatives against HUNGER and Thirst. There were some compositions in vogue among the ancients, for averting the direful effects of hunger and thirst; and were held by them to be extremely necessary in time of scarcity, long voyages, and warlike expeditions. Pliny says, that a small portion of some things allays the hunger and thirst, and preserves strength: such as butter, cheese made of mare's milk, and liquorice. The American Indians use a composition of the juice of tobacco, with calcined shells of snails, cockles, oysters, &c. which they make into pills, and dry in the shade. Whenever they go upon a long journey, and are likely to be destitute of provisions by the way, they put one of these pills between the lower lip and the teeth, and by swallowing what they suck from it, feel neither hunger, thirst, nor fatigue, for four or five days together.

The following composition is an extract from a manuscript scholium on a book of Heron in the Vatican library; and one much to the same effect, with some others, may be seen in Philo's fifth book of Military Affairs. It was reputed an exceeding nutritive medicament, and also very effectual for banishing thirst. Both the besiegers of cities, and the besieged, fed upon it, in time of extremity, and called it the *Epimædian Composition*, from the sea-onion, which was an ingredient in its composition. The process is thus:

The sea-onion being boiled, washed with water, and afterwards dried, it was cut into very thin slices, to which a fifth part of sesame was added, and a sixteenth of poppy; all which being mixed and worked up into a mass with honey, the whole was divided into portions about the bigness of a walnut, whereof two in the day, taken morning and evening, were sufficient to prevent hunger and thirst.

There was another way of preparing it, by taking a pint of sesame, the same quantity of oil, and two quarts of unshelled sweet almonds; when the sesame was dried, and the almonds ground and sifted, the sea-onions were to be peeled and sliced, the roots and leaves being cut off: then, pounding them in a mortar till reduced to a pap, an equal part of honey was to be added, and both worked up with the oil: afterwards all the ingredients were to be put into a pot on the fire, and stirred with a wooden ladle till thoroughly mixed. When the mass acquired a solid consistence, it was taken off the fire, and formed into lozenges; of which two only, as above, were very sufficient for a day's subsistence.

Avicenna relates, that a person, setting out upon a journey, drank one pound of oil of violets, mixed with melted beef-suet; and afterwards continued fasting for ten days together, without the least hunger. He says, that the oil of almonds and beef-suet will effect the same by their viscosity. Hence it was that this celebrated physician, who knew things more by unquestionable experiments than by idle speculations and conjectures, prescribed the following composition, which in time of famine, by sea or land, might be extremely serviceable:

“ Take of sweet almonds, unshelled, one pound; the
like

like quantity of melted beef-suet ; of oil of violets, two ounces ; a sufficient quantity of mucilage ; and of the roots of marsh-mallows, one ounce : let all together be brayed in a mortar, and made into bolusses about the bigness of a common nut. They must be kept so as to prevent their melting by the heat of the sun."—See also the article *Gum-Arabic*.

HUNNS, a fierce and savage nation, who formerly inhabited that part of Sarmatia bordering on the Paulus Meotis and the Tanais, the ancient boundary between Europe and Asia. Their country, as described by Procopius, lay north of mount Caucasus, which, extending from the Euxine to the Caspian Seas, parts Asiatic Sarmatia from Colchis, Iberia, and Albania ; lying on the isthmus between the two seas abovementioned. Here they resided, unknown to other nations, and themselves ignorant of other countries, till the year 376. At this time, an hind pursued by the hunters, or, according to some authors, an ox stung by a gad-fly, having passed the marsh, was followed by some Huns to the other side, where they discovered a country much more agreeable than their own. On their return, having acquainted their countrymen with what they had seen, the whole nation passed the marsh, and, falling upon the Alans who dwelt on the banks of the Tanais, almost exterminated them. They next fell upon the Othogoths, whom they drove out of their country, and forced to retire to the plains between the Boryllhenes and the Tanais, now known by the name of *Podolia*. Then attacking the Visigoths, they obliged them to shelter themselves in the most mountainous parts of their country ; till at last, the Gothic nations finding it impossible to withstand such an inundation of barbarians, obtained leave from the emperor Valens to settle in Thrace.

The Huns thus became masters of all the country between the Tanais and Danube in 376, where they continued quietly till the year 388, when great numbers of them were taken into the pay of Theodosius I. but, in the mean time, a party of them, called the *Nephthalite* or *White Huns*, who had continued in Asia, over-ran all Mesopotamia, and even laid siege to Edessa, where they were repulsed with great slaughter by the Romans. The European Huns frequently passed the Danube, committing the greatest ravages in the western empire ; sometimes they fell upon the eastern provinces, where they put all to fire and sword. They were often defeated and repulsed by the Romans, but the empire was now too weak to subdue or confine them from making excursions ; so that they continued to make daily encroachments, and became every day more formidable than before. In 441, the Huns, under Attila, threatened the western empire with total destruction. This monarch, having made himself master of all the northern countries from the confines of Persia to the banks of the Rhine, invaded Mæzia, Thrace, and Illyricum ; where he made such progress, that the emperor, not thinking himself safe in Constantinople, withdrew into Asia. Attila then broke into Gaul ; where he took and destroyed several cities, massacring the inhabitants with the greatest cruelty. At last he was driven out with great slaughter by Aetius the Roman general and Theodoric king of the Goths, and could never afterwards make any great progress. About the year 452 or 453 Attila died,

and his kingdom was immediately split into a number of small ones by his numerous children, who waged perpetual war with each other. The Huns then ceased to be formidable, and became daily less able to cope with the other barbarous nations whom Attila had kept in subjection. Still, however, their dominion was considerable ; and in the time of Charles the Great they were masters of Transylvania, Walachia, Servia, Carniola, Carinthia, and the greater part of Austria, together with Bosnia, Sclavonia, and that part of Hungary which lies beyond the Danube. In the year 776, while Charles was in Saxony, two princes of the Huns, Caganus and Jugunus, sent ambassadors to him, desiring his friendship and alliance. Charles received them with extraordinary marks of friendship, and readily complied with their request. However, they entered, not long after, into an alliance with Tassila duke of Bavaria, who had revolted from Charles, and raised great disturbances in Germany. Charles dissembled his resentment till he had entirely reduced Bavaria, when he resolved to revenge himself on the Huns for those succours they had underhand given to his enemy. Accordingly, he ordered levies to be made throughout his dominions ; and having by that means assembled a very numerous army, he divided it into two bodies, one of which he commanded himself, and the other he committed to the care of his generals. The two armies entered the country of the Huns at different places, ravaged their country far and near, burnt their villages, and took all their strong holds. This he continued for eight years, till the people were almost totally extirpated ; nor did the Huns ever afterwards recover themselves, or appear as a distinct nation.

There were two different nations that went by the name of *Huns* ; the *Nephthalite* or *White Huns*, and the *Sarmatian* or *Scythian Huns*. The former inhabited a rich country, bordering to the north on Persia, and at a great distance from the *Sarmatian* or *Scythian Huns*, with whom they had no intercourse, nor the least resemblance either in their persons or manners. They were a powerful nation, and often served against the Romans in the Persian armies ; but, in the reign of the emperor Zeno, being provoked by Perozes king of Persia laying claim to part of their country, they defeated the Persians in two pitched battles, slew their king, over-ran all Persia, and held it in subjection for the space of two years, obliging Cabades, the son and successor of Perozes, to pay them a yearly tribute. These Huns, called by the writers of those times the *white Huns*, did not wander, like the others, from place to place ; but, contented with their own country, which supplied them with all necessaries, they lived under a regular government, subject to one prince, and seldom made incursions, unless provoked, either into the Persian or Roman territories. They lived according to their own laws, and dealt uprightly with one another, as well as with the neighbouring people. Each of their great men used to choose 20 or more companions to enjoy with him his wealth, and partake of all his diversions ; but, upon his decease, they were all buried with him in the same grave. This custom favours of barbarity ; but, in every other respect, the *Nephthalite* were a far more civilized nation than the *Scythian Huns*, who, break-

Hunns
Hunting.

Hunting

ing into the empire, filled most of the provinces of Europe with blood and slaughter.

The latter were, according to Ammianus Marcellinus, a savage people, exceeding in cruelty the most barbarous nations. They began to practise their cruelty, says Jornandes, upon their own children the very first day they come into the world, cutting and mangling the cheeks of their males, to prevent the growth of hair, which they must have looked upon, contrary to the sentiments of other nations, as unbecoming and unmanly. They had, perhaps, in this practice another view, which Jornandes seems to insinuate elsewhere, viz. to strike terror into the enemy with their countenances, thus deformed and covered with scars. They had no other food but roots and raw meat, being quite unacquainted with the use of fire, and no houses at all, not even huts; but lived constantly exposed to the air in the woods, and on the mountains, where, from their infancy, they were inured to hunger, thirst, and all manner of hardships: nay, they had such an aversion to houses, which they called the *sepulchres of the living*, that, when they went into other countries, they could hardly be prevailed upon to come within the walls of any house, not thinking themselves safe when shut up and covered. They used even to eat and sleep on horseback, scarce ever dismounting; which, in all likelihood, induced Zosimus to write, that the Hunns could not walk. They covered their nakedness with goats skins, or the skins of a sort of mice sewed together. Day and night were indifferent to them, as to buying, selling, eating, and drinking. They had no law, nor any kind of religion; but complied with their inclinations, whatever they prompted them to, without the least restraint, or distinction between good and evil. In war, they began the battle with great fury, and an hideous noise: but, if they met with a vigorous opposition, their fury began to abate after the first onset; and, when once put in disorder, they never rallied, but fled in the utmost confusion. They were quite unacquainted with the art of besieging towns; and authors observe, that they never attacked the enemy's camp. They were a faithless nation, and thought themselves no longer bound by the most solemn treaties, than they found their advantage in observing them. Hence we often find them, upon the least prospect of obtaining more advantageous conditions, breaking into the Roman empire, in defiance of the most solemn oaths and engagements. Several corps of Huns, after their coming into Europe, served in the Roman armies against the Goths and other barbarous nations; nay, they were ready, for hire, to fight against each other, being blind to every other regard and consideration.

HUNGERFORD, a town of Berkshire, in England, seated on the river Kennet, in a low and watery soil, and noted for the best trouts and craw-fish in all England. W. Long. 1. 35. N. Lat. 26.

HUNNINGUEN, a town of Germany, in Alsace, and in Suintgaw, subject to the French; seated on the Rhine, and fortified by Vauban. E. Long. 11. 40. N. Lat. 47. 42.

HUNTING, the exercise or diversion of pursuing four-footed beasts of game. See the article **GAME**.

Four-footed beasts are hunted in the fields, woods,

and thickets, and that both with guns and gre-hounds.

Birds, on the contrary, are either shot in the air, or taken with nets and other devices, which exercise is called *fowling*; or they are pursued and taken by birds of prey, which is called *hawking*. See the articles **FOWLING**, **HAWKING**, **FALCONRY**, **SHOOTING**, **BIRD-CATCHING**, and **DECOY**.

The pursuing of four-footed beasts, as badgers, deer, does, roebucks, foxes, hares, &c. properly termed *hunting*, is a noble exercise, serving not only to recreate the mind, but to strengthen the limbs, whet the stomach, and cheer the spirits. However, all sorts of weather are not proper for hunting; high winds and rain being great obstacles to it. In the spring season, this diversion should be taken in the night-time with nets; in the summer, the morning is the most proper time for it; and in the winter, it should only be followed from nine in the morning till two in the afternoon. The general rule is, that you place yourself under the wind, where you design to wait for game.

F. de Launay, professor of the French laws, has an express treatise of hunting.—From those words of God to Adam, Gen. i. 26, and 28. and to Noah, Gen. ix. 2, 3. hunting was considered as a right devolved or made over to man; and the following ages appear to have been of the same sentiment. Accordingly we find, that among the more civilized nations, as the Persians, Greeks, and Romans, it made one of their genteeler diversions; and as to the wilder and more barbarous, it served them with food and necessities.—The Roman jurisprudence, which was formed on the manners of the first ages, made a law of it, and established it as a maxim, that as the natural right of things which have no master belongs to the first possessor, wild beasts, birds, and fishes, are the property of whomsoever can take them first.

But the northern nations of barbarians who over-ran the Roman empire, bringing with them a stronger taste for the diversion, and the people being now possessed of other and more easy means of subsistence from the lands and possessions of those they had vanquished, their chiefs and leaders began to appropriate the right of hunting, and, instead of a natural right, to make it a royal one.—Thus it continues to this day; the right of hunting, among us, belonging only to the king, and those who derive it from him.

The hunting used by the ancients, was much like that now practised for the rein-deer; which is seldom hunted at force, or with hounds; but only drawn with a blood-hound, and forestalled with nets and engines. Thus did they with all beasts; whence a dog is never commended by them for opening, before he has discovered where the beast lies. Hence, they were not in any manner curious as to the music of their hounds, or the composition of their kennel or pack, either for deepness, loudness, or sweetness of cry, which is a principal point in the hunting of our days.—Their huntsmen, indeed, were accustomed to shout and make a great noise, as Virgil observes in the third of his *Georgics*: *Ingentem clamore preme ad retia ceruum*. But that confusion was only to bring the deer to the nets laid for him.

The Sicilian way of hunting had something in it very

very extraordinary.—The nobles or gentry being informed which way a herd of deer passed, gave notice to one another, and appointed a meeting; every one bringing with him a cross-bow or long bow, and a bundle of staves shod with iron, the heads bored, with a cord passing through them all: thus provided, they came to the herd, and, casting themselves about in a large ring, surrounded the deer.—Then, each taking his stand, unbound his faggot, set up his stake, and tied the end of the cord to that of his next neighbour, at the distance of ten foot from one another.—Then taking feathers, died in crimson, and fastened on a thread, they tied them to the cord; so that with the least breath of wind, they would whirl round.—Which done, the persons who kept the stands withdrew, and hid themselves in the next covert. Then the chief ranger entering within the line with hounds to draw after the herd, roused the game with their cry; which flying towards the line, were turned off, and, still gazing on the shaking and shining feathers, wandered about as if kept in with a real wall or pale. The ranger still pursued, and calling every person by name, as he passed by their stand, commanded him to shoot the first, third, or sixth, as he pleased; and if any of them missed, or singled out another than that assigned him, it was counted a grievous disgrace. By such means, as they passed by the several stations, the whole herd was killed by the several hands. *Pier. Hieroglyphic. lib. vii. cap. 6.*

The gentlemen and masters of the sport have invented a new set of terms which may be called the *hunting language*. The principal are those which follow:

1. For beasts as they are in company.—They say, a *herd* of harts, and all manner of deer. A *boy* of roes. A *founder* of swine. A *roost* of wolves. A *riches* of martens. A *brace* or *leash* of bucks, foxes, or hares. A *couple* of rabbits or coneyes.

2. For their lodging.—A hart is said to *harbour*. A buck *lodges*. A roe *beds*. A hare *seats* or *forms*. A coney *sits*. A fox *kennels*. A marten *trees*. An otter *atches*. A badger *earths*. A boar *couches*.—Hence, to express their dislodging, they say, *Unharbour* the hart. *Rouse* the buck. *Start* the hare. *Bolt* the coney. *Unkennel* the fox. *Tree* the marten. *Vent* the otter. *Dig* the badger. *Rear* the boar.

3. For their noise at rutting time.—A hart *belletth*. A buck *growns* or *troats*. A roe *bellows*. A hare *beats* or *taps*. An otter *whines*. A boar *freams*. A fox *barks*. A badger *shrieks*. A wolf *howls*. A goat *rattles*.

4. For their copulation.—A hart or buck goes to *rut*. A roe goes to *tourn*. A boar goes to *brim*. A hare or coney goes to *buck*. A fox goes to *climkitting*. A wolf goes to *match* or *make*. An otter *hunteb* for his kind.

5. For the footing and treading.—Of a hart, we say the *stot*. Of a buck, and all fallow-deer, the *view*. Of all deer, if on the grass and scarce visible, the *foiling*. Of a fox, the *print*; and of other the like vermin, the *footing*. Of an otter, the *marks*. Of a boar, the *track*. The hare, when in open field, is said to *fore*; when the winds about to deceive the hounds, the *doubles*; when she beats on the hard highway, and her footing comes to be perceived, she *pricketh*: in snow, it is called the *trace* of the hare.

6. The tail of a hart, buck, or other deer, is called the *single*. That of a boar, the *sweath*. Of a fox, the *brush* or *drag*; and the tip at the end, the *chape*. Of a wolf, the *stern*. Of a hare and coney, the *scut*.

7. The ordure or excrement of a hart and all deer, is called *sewennets* or *sewennish*. Of a hare, *crotiles* or *crotisling*. Of a boar, *lesser*. Of a fox, the *billiting*; and of other the like vermin, the *suants*. Of an otter, the *spraints*.

8. As to the attire of deer, or parts thereof, those of a stag, if perfect, are the *bur*, the *pearls*, the little *knobs* on it, the *beams*, the *gutters*, the *antler*, the *sur-antler*, *royal*, *sur-royal*, and all at top the *croches*. Of the buck, the *bur*, *beam*, *brow-antler*, *black-antler*, *advancer*, *palm*, and *spellers*. If the croches grow in the form of a man's hand, it is called a *palméd head*. Heads bearing not above three or four, and the croches placed aloft, all of one height, are called *crowned heads*. Heads having double croches, are called *forked heads*, because the croches are planted on the top of the beam like forks.

9. They say, a *litter* of cubs, a *nest* of rabbits, a *squirrel's drag*.

10. The terms used in respect of the dogs, &c. are as follow.—Of gre-hounds, two make a *brace*; of hounds, a *couple*. Of gre-hounds, three make a *leash*; of hounds, a *couple* and *half*.—They say, *let slip* a gre-hound; and, *cast off* a hound. The string wherein a gre-hound is led, is called a *leash*; and that of a hound, a *horne*. The gre-hound has his *collar*, and the hound his *cuples*. We say a *kennel* of hounds, and a *pack* of beagles.

HUNTING, as practised among us, is chiefly performed with dogs; of which we have various kinds, accommodated to the various kinds of game, as *hounds*, *gre-hounds*, *blood-hounds*, *terriers*, &c. See CANIS, HOUND, &c.

In the kennels or packs they generally rank them under the heads of *enters*, *drivers*, *flyers*, *tyers*, &c.

On some occasions, nets, spears, and instruments for digging the ground, are also required: nor is the hunting-horn to be omitted.

The usual chases among us, are the *hart*, *buck*, *roe*, *hare*, *fox*, *badger*, and *otter*.—We shall here give something of what relates to each thereof: first premising an explanation of some general terms and phrases, more immediately used in the progress of the sport itself; what belongs to the several sorts of game in particular, being reserved for the respective articles.

When the hounds then, being cast off, and finding the scent of some game, begin to open and cry; they are said to *challenge*. When they are too busy ere the scent be good, they are said to *babble*. When too busy where the scent is good, to *barwl*. When they run it endwise orderly, holding in together merrily, and making it good, they are said to be in *full cry*. When they run along without opening at all, it is called *running mute*.

When spaniels open in the spring, or a gre-hound in the course, they are said to *lapse*.

When beagles bark and cry at their prey, they are said to *yearn*.

When the dogs hit the scent the contrary way, they are said to *draw amiss*.

When they take fresh scent, and quit the former chafe for a new one, it is called *hunting change*.

When they *hunt* the game by the heel or track, they are said to *hunt counter*.

When the chafe goes off, and returns again, traversing the same ground, it is called *hunting the foil*.

When the dogs run at a whole herd of deer, instead of a single one, it is called *running riot*.

Dogs set in readiness where the game is expected to come by, and cast off after the other hounds are passed, are called a *relay*. If they be cast off ere the other dogs be come up, it is called a *vauntail*.

When, finding where the chafe has been, they make a proffer to enter, but return, it is called a *blenish*.

A lesson on the horn to encourage the hounds, is named a *call*, or a *recheat*. That blown at the death of a deer, is called the *mort*. The part belonging to the dogs of any chafe they have killed, is the *reward*. They lay, *take off* a deer's skin; *strip* or *case* a hare, fox, and all sorts of vermin; which is done by beginning at the snout, and turning the skin over the ears down to the tail.

HUNTING is practised in a different manner, and with different apparatus, according to the nature of the beasts which are hunted, a description of whom may be found under their respective articles, *infra*.

With regard to the seasons, that for hart and buck-hunting begins a fortnight after midsummer, and lasts till Holy-rod day; that for the hind and doe, begins on Holy-rod day, and lasts till Candlemas; that for fox-hunting begins at Christmas, and holds till Lady-day; that for roe-hunting begins at Michaelmas, and ends at Christmas; hare-hunting commences at Michaelmas, and lasts till the end of February; and where the wolf and boar are hunted, the season for each begins at Christmas, the first ending at Lady-day, and the latter at the Purification.

When the sportsmen have provided themselves with nets, spears, and a hunting-horn to call the dogs together, and likewise with instruments for digging the ground, the following directions will be of use to them in the pursuit of each fort of game.

Badger-HUNTING. In doing this, you must seek the earths and burrows where he lies, and in a clear moonshine night go and stop all the burrows, except one or two, and therein place some sacks, fastened with drawing strings, which may shut him in as soon as he straieth the bag. Some use no more than to set a hoop in the mouth of the sack, and so put it into the hole; and as soon as the badger is in the sack and straieth it, the sack slippeth off the hoop and follows him into the earth, so he lies tumbling therein till he is taken. These sacks or bags being thus set, cast off the hounds, beating about all the woods, coppices, hedges, and tufts, round about, for the compals of a mile or two; and what badgers are abroad, being alarmed by the hounds, will soon betake themselves to their burrows: and, observe that he who is placed to watch the sacks, must stand close and upon a clear wind; otherwise the badger will discover him, and will immediately fly some other way into his burrow. But if the hounds can encounter him before he can take his sanctuary, he will then stand at a bay like a boar, and make good sport, grievously biting and clawing the dogs, for the manner of their fighting is lying on

their backs, using both teeth and nails; and by blowing up their flims defend themselves against all bites of the dogs, and blows of the men upon their noses as afore said. And for the better preservation of your dogs, it is good to put broad collars about their necks made of greys skins.

When the badger perceives the terriers to begin to yearn him in his burrow, he will stop the hole betwixt him and the terriers, and if they still continue baying, he will remove his couch into another chamber or part of the burrow, and so from one to another, barricading the way before them, as they retreat, until they can go no further. If you intend to dig the badger out of his burrow, you must be provided with the same tools as for digging out a fox; and besides, you should have a pail of water to refresh the terriers, when they come out of the earth to take breath and cool themselves. It will also be necessary to put collars of bells about the necks of your terriers, which making a noise may cause the badger to bolt out. The tools used for digging out of the badger, being troublesome to be carried on mens backs, may be brought in a cart. In digging, you must consider the situation of the ground, by which you may judge where the chief angles are; for else, instead of advancing the work, you will hinder it. In this order you may besiege them in their holds, or callles; and may break their platforms, parapets, casemates, and work to them with mines and countermines until you have overcome them.

Having taken a live and lusty badger, if you would make sport, carry him home in a sack and turn him out in your court-yard, or some other inclosed place, and there let him be hunted and worried to death by your hounds.

There are the following profits and advantages which accrue by killing this animal. Their flesh, blood; and grease, though they are not good food, yet are very useful for physicians and apothecaries for oils, ointments, salves, and powders for shortness of breath, the cough of the lungs, for the stone, sprained sinews, colic-aches, &c. and the skin being well dressed, is very warm and good for old people who are troubled with paralytic distempers.

Buck-HUNTING. Here the same hounds and methods are used as in running the stag; and, indeed, he that can hunt a hart or stag well, will not hunt a buck ill.

In order to facilitate the chase, the game-keeper commonly selects a fat buck out of the herd, which he shoots in order to maim him, and then he is run down by the hounds.

As to the method of hunting the buck. The company generally go out very early for the benefit of the morning. Sometimes they have a deer ready lodged; if not, the coverts are drawn till one is roused; or sometimes in a park a deer is pitched upon, and forced from the herd, then more hounds are laid on to run the chace. If you come to be at a fault, the old staunch hounds are only to be relied upon till you recover him again: if he be sunk, and the bounds thrust him up, it is called an *imprime*, and the company all found a recheat; when he is run down, every one strives to get in to prevent his being torn by the hounds, fallow-deer seldom or never standing at bay.

Hunting.

He that first gets in, cries hoo-up, to give notice that he is down and blows a death. When the company are all come in, they paunch him, and reward the hounds; and generally the chief person of quality amongst them *takes say*, that is, cuts his belly open, to see how fat he is. When this is done, every one has a chop at his neck; and the head being cut off, is shewed to the hounds, to encourage them to run only at male deer, which they see by the horns, and to teach them to bite only at the head: then the company all standing in a ring, one blows a single death; which being done, all blow a double recheat, and so conclude the chase with a general halloo of hoo-up, and depart the field to their several homes, or to the place of meeting; and the huntsman, or some other, hath the deer cast cross the buttocks of his horse, and so carries him home.

FOX-HUNTING makes a very pleasant exercise, and is either above or below ground.

1. Above ground. To hunt a fox with hounds, you must draw about groves, thickets, and bushes near villages. When you find one, it will be necessary to stop up his earth the night before you design to hunt, and that about midnight; at which time he is gone out to prey: this may be done by laying two white sticks across in his way, which he will imagine to be some gin or trap laid for him; or else they may be stopped up with black thorns and earth mixed together.

At first, only cast off your sure finders; and as the drag mends, add more as you dare trust them. The hound first cast off should be old and staunch; and when you hear such a hound call on merrily, you may cast off some others to him; and when they run it on the full cry, cast off the rest: thus you shall complete your pastime. The words of comfort are the same which are used in other chases. The hounds should be left to kill the fox themselves, and to worry and tear him as much as they please: some hounds will eat him with eagerness.

When he is dead, hang him at the end of a pike-staff, and halloo in all your hounds to bay him: but reward them with nothing belonging to the fox; for it is not good, neither will the hounds in common eat it.

2. Under ground. In case a fox does so far escape as to earth, countrymen must be got together with shovels, spades, mattocks, pickaxes, &c. to dig him out, if they think the earth not too great. They make their earths as near as they can in ground that is hard to dig, as in clay, stony ground, or amongst the roots of trees; and their earths have commonly but one hole, and that is straight a long way in before you come at their couch. Sometimes craftily they take possession of a badger's old burrow, which hath a variety of chambers, holes, and angles.

Now to facilitate this way of hunting the fox, the huntsman must be provided with one or two terriers to put into the earth after him, that is, to fix him into an angle; for the earth often consists of many angles: the use of the terrier is to know where he lies; for as soon as he finds him, he continues baying or barking, so that which way the noise is heard that way dig to him. Your terriers must be garnished with bells hung in collars, to make the fox bolt the sooner; besides, the collars will be some small defence to the terriers.

Hunting.

The instruments to dig withal are these: a sharp-pointed spade, which serves to begin the trench where the ground is hardest and broader tools will not so well enter; the round hollowed spade, which is useful to dig among roots, having very sharp edges; the broad flat spade to dig withal, when the trench has been pretty well opened, and the ground softer; mattocks and pickaxes to dig in hard ground, where a spade will do but little service; the coal-rake to cleanse the hole, and to keep it from stopping up; clamps, wherewith you may take either fox or badger out alive to make sport with afterwards. And it would be very convenient to have a pail of water to refresh your terriers with, after they are come out of the earth to take breath.

HARE-HUNTING. As, of all chases, the hare makes the greatest pastime, so it gives no little pleasure to see the craft of this small animal for her self-preservation. If it be rainy, the hare usually takes to the high-ways; and if she come to the side of a young grove, or spring, the seldom enters, but squats down till the hounds have over-shot her; and then she will return the very way she came, for fear of the wet and dew that hangs on the boughs. In this case, the huntsman ought to stay an hundred paces before he comes to the wood-side, by which means he will perceive whether she return as aforesaid; which if she do, he must halloo in his hounds, and call them back; and that presently, that the hounds may not think it the counter she came first.

The next thing that is to be observed, is the place where the hare sits, and upon what wind she makes her form, either upon the north or south wind; she will not willingly run into the wind, but run upon a-side, or down the wind; but if she form in the water, it is a sign she is foul and meafled: if you hunt such a one, have a special regard all the day to the brook-sides; for there, and near plashees, she will make all her crossings, doublings, &c.

Some hares have been so crafty, that as soon as they have heard the sound of a horn, they would instantly start out of their form, though it was at the distance of a quarter of a mile, and go and swim in some pool, and rest upon some rush-bed in the midst of it; and would not stir from thence till they have heard the sound of the horn again, and then have started out again, swimming to land, and have stood up before the hounds four hours before they could kill them, swimming and using all subtilties and crossings in the water. Nay, such is the natural craft and subtilty of a hare, that sometimes, after she has been hunted three hours, she will start a fresh hare, and squat in the same form. Others having been hunted a considerable time, will creep under the door of a sheep-cot, and hide themselves among the sheep; or, when they have been hard hunted, will run in among a flock of sheep, and will by no means be gotten out from among them, till the hounds are coupled up, and the sheep driven into their pens. Some of them (and that seems somewhat strange,) will take the ground like a coney, and that is called *going to the vault*. Some hares will go up one side of the hedge, and come down the other, the thickness of the hedge being the only distance between the courses. A hare
that

Hunting. that has been sorely hunted, has got upon a quickset hedge, and ran a good way upon the top thereof, and then leapt off upon the ground. And they will frequently betake themselves to furz-bushes, and will leap from one to the other, whereby the hounds are frequently in default.

Having found where a hare hath relieved in some pasture or corn-field, you must then consider the season of the year, and what weather it is: for if it be in the spring-time or summer, a hare will not then set in bushes, because they are frequently infested with pismires, snakes, and adders; but will set in corn-fields, and open places. In the winter-time, they set near towns and villages, in tufts of thorns and brambles, especially when the wind is northerly or southerly. According to the season and nature of the place where the hare is accustomed to sit, there beat with your hounds, and start her; which is much better sport than traying of her from her relief to her form.

After the hare has been started and is on foot, then step in where you saw her pass, and halloo in your hounds, until they have all undertaken it and go on with it in full cry: then recleave to them with your horn, following fair and softly at first, making not too much noise either with horn or voice; for at the first, hounds are apt to overhoot the chase through too much heat. But when they have run the space of an hour, and you see the hounds are well in with it, and stick well upon it, then you may come in nearer with the hounds, because by that time their heat will be cooled, and they will hunt more soberly. But above all things, mark the first doubling, which must be your direction for the whole day; for all the doublings that she shall make afterwards will be like the former; and according to the policies that you shall see her use, and the place where you hunt, you must make your compasses great or little, long or short, to help the defaults, always seeking the moistest and most commodious places for the hounds to scent in.

To conclude: Those who delight in hunting the hare, must rise early, lest they be deprived of the scent of her foot-steps.

Hart or Stag HUNTING. Gesner, speaking of hart-hunting, observes, that this wild, deceitful, and subtle beast frequently deceives its hunter, by windings and turnings. Wherefore, the prudent hunter must train his dogs with words of art, that he may be able to set them on and take them off again at pleasure.

First of all, he should encompass the beast in her own layer, and so unharbour her in the view of the dogs, that so they may never lose her slot or footing. Neither must he set upon every one, either of the herd or those that wander solitary alone, or a little one; but partly by sight, and partly by their footing and fumets, make a judgment of the game, and also observe the largeness of his layer.

The huntsman, having made these discoveries in order to the chase, takes off the couplings of the dogs; and some on horseback, others on foot, follow the cry, with the greatest art, observation, and speed; remembering and intercepting him in his subtle turnings and headings; with all agility leaping hedges, gates, pales, ditches; neither fearing thorns, down hills, nor woods, but mounting fresh horse, if the first

tire. Follow the largest head of the whole herd, which must be singled out of the chase; which the dogs perceiving, must follow; not following any other. The dogs are animated to the sport by the winding of horns, and the voices of the huntmen. But sometimes the crafty beast sends forth his little lquire to be sacrificed to the dogs and hunters, instead of himself, lying close the mean time. In this case, the huntsman must sound a retreat, break off the dogs, and take them in, that is, lead them again, until they be brought to the fairer game; which riseth with fear, yet still fiveth by sight, until he be wearied and breathless. The nobles call the beast a *wife hart*, who, to avoid all his enemies, runneth into the greatest herds, and so brings a cloud of error on the dogs, to obstruct their farther pursuit; sometimes also bearing some of the herd into his footings, that so he may the more easily escape, by amusing the dogs. Afterwards he betakes himself to his heels again, still running with the wind, not only for the sake of refreshment, but also because by that means he can the more easily hear the voice of his pursuers whether they be far from him or near to him. But at last being again discovered by the hunters and sagacious scent of the dogs, he flies into the herds of cattle, as cows, sheep, &c. leaping on a cow or ox, laying the fore-parts of his body thereon, that so touching the earth only with his hinder feet, he may leave a very small or no scent at all behind for the hounds to discern. But their usual manner is, when they see themselves hard beset and every way intercepted, to make force at their enemy with their horns, who first comes upon him, unless they be prevented by spear or sword. When the beast is slain, the huntsman with his horn windeth the fall of the beast; and then the whole company comes up, blowing their horns in triumph for such a conquest; among whom, the skillfullest opens the beast, and rewards the hounds with what properly belongs to them, for their future encouragement; for which purpose the huntmen dip bread in the skin and blood of the beast, to give to the hounds.

It is very dangerous to go in to a hart at bay; of which there are two sorts, one on land and the other in water. Now if the hart be in a deep water, where you cannot well come at him, then couple up your dogs; for should they continue long in the water, it would endanger their subrating or foundering. In this case, get a boat, and swim to him, with dagger drawn, or else with rope that has a noose, and throw it over his horns: for if the water be so deep that the hart swims, there is no danger in approaching him; otherwise you must be very cautious.

As to the land bay, if a hart be burnished, then you must consider the place; for if it be in a plain and open place, where there is no wood nor covert, it is dangerous and difficult to come in to him; but if he be on a hedge-side, or in a thicket, then, while the hart is staring on the hounds, you may come softly and covertly behind him, and cut his throat. If you miss your aim, and the hart turn head upon you, then take refuge at some tree; and when the hart is at bay, couple up your hounds; and when you see the hart turn head to fly, gallop in roundly to him, and kill him with your sword.

Directions at the Death of a Hart or Buck. The first

first ceremony, when the huntsman comes in to the death of a deer, is to cry "ware haunch," that the hounds may not break in to the deer; which being done, the next is the cutting his throat, and there bleeding the youngest hounds, that they may the better love a deer, and learn to leap at his throat: then the mort having been blown, and all the company come in, the best person who hath not taken say before, is to take up the knife that the keeper or huntsman is to lay across the belly of the deer, some holding by the fore-legs, and the keeper or huntsman drawing down the pizzle, the person who takes say, is to draw the edge of the knife leisurely along the middle of the belly, beginning near the brisket, and drawing a little upon it, enough in the length and depth to discover how fat the deer is; then he that is to break up the deer, first slits the skin from the cutting of the throat downwards, making the arber, that for the ordure may not break forth, and then he paunches him, rewarding the hounds with it.

In the next place, he is to present the same person who took say, with a drawn hanger, to cut off the head of the deer. Which being done, and the hounds rewarded, the concluding ceremony is, if it be a stag, to blow a triple mort; and if a buck, a double one; and then all who have horns, blow a recheat in concert, and immediately a general whoop, whoop.

OTTER-HUNTING is performed with dogs, and also with a sort of instruments called *otter-spears*; with which when they find themselves wounded, they make to land, and fight with the dogs, and that most furiously, as if they were sensible that cold water would annoy their green wounds.

There is indeed craft to be used in hunting them; but they may be caught in snares under water, and by river-sides: but great care must be taken, for they bite forely and venomously; and if they happen to remain long in the snare, they will not fail to get themselves free by their teeth.

In hunting them, one man must be on one side of the river, and another on the other, both beating the banks with dogs; and the beast not being able to endure the water long, you will soon discover if there be an otter or not in that quarter; for he must come out to make his spraints, and in the night sometimes to feed on grubs and herbs.

If any of the hounds finds out an otter, then view the soft grounds and moist places, to find out which way he bent his head: if you cannot discover this by the marks, you may partly perceive it by the spraints; and then follow the hounds, and lodge him as a hart or deer. But if you do not find him quickly, you may imagine he is gone to couch somewhere farther off from the river; for sometimes they will go to feed a considerable way from the place of their rest, choosing rather to go up the river than down it. The persons that go a-hunting otters, must carry their spears, to watch his vents, that being the chief advantage; and if they perceive him swimming under water, they must endeavour to strike him with their spears, and if they miss, must pursue him with the hounds, which, if they be good and perfectly entered, will go chanting and trailing along by the river side, and will beat every root of a tree, and oster-bed, and tuft of bulrushes; nay, they will sometimes take water, and

bait the beast, like a spaniel, by which means he will hardly escape.

ROE-BUCK HUNTING is performed divers ways, and very easily in the woods.

When chased, they usually run against the wind, because the coolness of the air refreshes them in their course; therefore the huntsmen place their dogs with the wind: they usually, when hunted, first take a large ring, and afterwards hunt the hounds. They are also often taken by counterfeiting their voice, which a skilful huntsman knows how to do by means of a leaf in his mouth. When they are hunted, they turn much and often, and come back upon the dogs directly; and when they can no longer endure, they take foil, as the hart does, and will hang by a bough in such a manner, that nothing of them shall appear above the water but their snout, and they will suffer the dogs to come just upon them before they will stir.

The venison of a roe-buck is never out of season, being never fat, and therefore they are hunted at any time; only that some favour ought to be shewn the doe while she is big with fawn, and afterwards till her fawn is able to shift for himself; but some roe-does have been killed with five fawns in their bellies.

He is not called, by the skilful in the art of hunting, a *great roe-buck*, but a *fair roe-buck*; the herd of them is called a *bevy*: and if he hath not bevy-grease upon his tail, when he is broken up, he is more fit to be dog's meat than man's meat. The hounds must be rewarded with the bowels, the blood, and feet flit afunder, and boiled all together; this is more properly called a *dose* than a *reward*.

HUNTING-MATCH. The first thing that is to be considered by one who designs to match his horse for his own advantage, and his horse's credit, is not to flatter himself with the opinion of his horse, by fancying that he is a swift, when he is but a slow galloper; and that he is a whole-running-horse (that is, that he will run four miles without a fob at the height of his speed) when he is not able to run two or three. Very probably some gentlemen are led into this error, by their being mistaken in the speed of their hounds, who, for want of trying them against other dogs that have been really fleet, have supposed their own to be so, when, in reality, they are but of a middling speed: and because their horse, when trained, was able to follow them all day, and upon any hour, to command them upon deep as well as light earths, have therefore made a false conclusion, that their horse is as swift as the best; but, upon trial against a horse that has been rightly trained after hounds that were truly fleet, have bought their experience perhaps full dear. Therefore it is advisable for all lovers of hunting to procure two or three couple of tried hounds, and once or twice a-week to follow after them at rain-scent; and when he is able to top them on all sorts of earth, and to endure heats and colds stoutly, then he may better rely on his speed and toughness.

That horse which is able to perform a hare-chase of five or six miles briskly and courageously, till his body be as it were bathed in sweat; and then, after the hare has been killed, in a nipping frosty morning, can endure to stand till the sweat be frozen on his back, so that he can endure to be pierced with the cold

Hunting.

cold as well as the heat; and then, even in that extremity of cold, to ride another chase as briskly and with as much courage as he did the former; that horse which can thus endure heats and colds, is most valued by sportsmen. Therefore, in order to make a judgment of the goodness of a horse, observe him after the death of the first hare, if the chase has been any thing brisk: if, when he is cold, he shirks up his body, and draws his legs up together, it is an infallible sign of want of vigour and courage: the like may be done by the slackening of his girths after the first chase, and from the dulness of his teeth, and the dulness of his countenance, all which are true tokens of faintness and being tired; and such a horse is not to be relied on, in case of a wager.

Here it will not be improper to take notice of the way of making matches in former times, and the modern way of deciding wagers. The old way of trial was, by running for many train-scents after hounds, as was agreed upon between the parties concerned, and a bell-course, this being found not so uncertain, but more durable than hare-hunting; and the advantage consisted in having the trains led on earth most suitable to the qualifications of the horses. But now others chuse to hunt the hare till such an hour, and then to run this wild-goose chase; a method of racing that takes its name from the manner of the flight of wild-geese, which is generally one after another; so the two horses, after running of twelvecore yards, had liberty, which horse soever could get the leading, to ride what ground he pleased, the hindmost horse being bound to follow him, within a certain distance agreed on by articles, or else to be whipped up by the triers or judges which rode by; and whichever horse could distance the other, won the match.

But this chase, in itself very inhuman, was soon found to be a very destructive to good horses, especially when two good horses were matched; for neither being able to distance the other, till both were ready to sink under their riders through weakness, oftentimes the match was vain to be drawn and left undecided, though both the horses were quite spoiled.

This brought up the custom of train-scents, which afterwards was changed to three heats and a straight course; and that the lovers of horses might be encouraged to keep good ones, plates have been erected in many places in England. The fewer of these before you come to the course, if your horse be fiery and mettled, the better; and the shorter the distance, the better. Also, above all things, be sure to make your bargain to have the leading of the first train; and then make choice of such grounds where your horse may best show his speed, and the fleetest dogs you can procure: give your hounds as much law before you as your triers will allow, and then, making a loose, try to win the match with a wind; but if you fail in this attempt, then bear your horse, and save him for the course; but if your horse be slow, but well-winded, and a true spurred nag, then the more train-scents you run before you come to the straight course, the better. But here you ought to observe to gain the leading of the first train; which in this case you must lead upon such deep earths, that it may not end near any light ground: for this is the rule received among horsemen; that the next train is to begin where the

last ends, and the last train is to be ended at the starting place of the course; therefore remember to end your last on deep earths, as well as the first.

HUNTINGDON, the county-town of Huntingdonshire in England, seated upon an easy ascent, on the north side of the river Ouse. It was made a free borough by king John, consisting of a mayor, 12 aldermen, burgesses, &c. by whom the two members of parliament are chosen. It had anciently 15 parishes, and has now but two; in one of which, called *St John's*, Oliver Cromwell was born, in 1599. Here was formerly a castle, built by William the Conqueror, which afterwards belonged to David, a prince of Scotland, with the title of *earl*; but Henry VIII. gave it to George Hastings, with the earldom annexed, in whose family it still continues. It stands in the great north road; and has a bridge built of free-stone over the Ouse, which is made navigable for small vessels as high as Bedford. It is the place where the assizes are kept, and where the county-jail stands. It has a good market-place, and several convenient inns, besides a grammar-school; and is very populous. W. Long. o. 15. N. Lat. 52. 23.

HUNTINGDONSHIRE, a county of England, bounded on the south by Bedfordshire; on the west by Northamptonshire, as also on the north; and by Cambridgeshire on the east. It is a good corn country; and abounds in pastures, especially on the eastern side, which is fenny. The rest is diversified by rising hills and shady groves, and the river Ouse waters the southern part.

The air of this county is in most parts pleasant and wholesome, except among the fens and meres, though they are not so bad as the hundreds of Kent and Essex. The soil is fruitful, and produces great crops of corn, and the hilly parts afford a fit pasture for sheep. They have great numbers of cattle; and plenty of water-fowl, fish, and turf for firing; which last is of great service to the inhabitants, there being but little wood, though the whole county was a forest in the time of Henry II. The only river besides the Ouse is the Nen, which runs through Whittlesey Mere.

HU-QUANG, a province of the kingdom of China, in Asia, which has a great river called *Tang*, and *Tschiang*, which runs cross it from east to west. It is divided into the north and south parts, the former of which contains eight cities of the first rank, and 60 of the second and third; and the latter, seven of the first rank, and five of the second and third. It is a flat, open country, watered every-where with brooks, lakes, and rivers, in which there are great numbers of fish. Here are plenty of wild-fowls; the fields nourish cattle without number, and the soil produces corn, and various kinds of fruits. There is gold found in the sands of the rivers; and in the mines they have iron, tin, &c. In short, there is such a variety of all sorts of commodities, that it is called *the magazine of the empire*.

HURA, the SAND-BOX-TREE; a genus of the monadelphica order, belonging to the monœcia class of plants. There is but one species, viz. the crepitans, a native of the West-Indies. It rises with a soft ligneous stem to the height of 24 feet, dividing into many branches, which abound with a milky juice, and have scars on their bark where the leaves have fallen

Hurdles fall off. The male-flowers come out from between the leaves upon foot-stalks three inches long; and are formed into a close spike or column, lying over each other like the scales of fish. The female-flowers are situated at a distance from them; and have a long funnel-shaped tube spreading at the top, where it is cut into 12 reflexed parts. After the flower, the germen swells, and becomes a round compressed ligneous capsule, having 12 deep furrows, each being a distinct cell, containing one large round compressed seed. When the pods are ripe, they burst with violence, and throw out their seeds to a considerable distance. It is propagated by seeds, raised on a hot-bed; and the plants must be constantly kept in a stove. The kernels are said to be purgative, and sometimes emetic.

HURDLES, in fortification, are made of twigs of willows or osiers interwoven close together, sustained by long stakes. They are made in the figure of a long square, the length being five or six feet, and the breadth three and an half. The closer they are wattled together, the better. They serve to render the batteries firm, or to consolidate the passage over muddy ditches; or to cover traverses and lodgements for the defence of the workmen against fire-works or stones thrown against them.

The Romans had a kind of military execution for mutineers, called *putting to death under the hurdle*. The manner of it was this: The criminal was laid at his length in a shallow water, under an hurdle, upon which was heaped stones, and so pressed down till he was drowned.

HURDLES, in husbandry, certain frames made either of split timber, or of hazle-rods wattled together, to serve for gates in inclosures, or to make sheep-folds, &c.

HURDS, or **HORDS**, of flax or hemp; the coarser parts separated in the dressings from the tear, or fine stuff. See **FLAX**.

HURL-BONE, in a horse, a bone near the middle of the buttock, very apt to go out of its sockets with a hurt or strain.

HURON, a vast lake of North-America, situated between 84° and 89° W. Long. and between 43° and 46° of N. Lat. from whence the country contiguous to it is called the *country of the Hurons*, whose language is spoken over a great extent in the southern parts of America.

HURRICANE, a general name for any violent storm of wind; but which is commonly applied to those storms which happen in the warmer climates, and which greatly exceed the most violent storms known in this country. The following description of them is given in the *Account of the European settlements in America*: "It is in the rainy season, principally in the month of August, more rarely in July and September, that they are assailed by hurricanes, the most terrible calamity to which they are subject from the climate. This destroys, at one stroke, the labour of many years, and frustrates the most exalted hopes of the planter; and often just at the moment when he thinks himself out of the reach of fortune. It is a sudden and violent storm of wind, rain, thunder, and lightning; attended with a furious swelling of the sea, and sometimes with an earthquake; in short, with every

circumstance which the elements can assemble that is terrible and destructive.

"First, they see, as a prelude to the ensuing havoc, whole fields of sugar-canes whirled into the air, and scattered over the face of the country. The strongest trees of the forest are torn up by the roots, and driven about like stubble. Their wind-mills are swept away in a moment. Their works, their fixtures, the ponderous copper-boilers and stills, of several hundred weight, are wrenched from the ground, and battered to pieces. Their houses are no protection: the roofs are torn off at one blast, whilst the rain, which in an hour rises five feet, rushes in upon them with an irresistible violence.

"There are signs, which the Indians of these islands taught our planters, by which they can prognosticate the approach of a hurricane. It comes on either in the quarters, or at the full or change of the moon. If it will come on at the full moon, you being at the change, observe these signs. That day you will see the sky very turbulent. You will observe the sun more red than at other times. You will perceive a dead calm, and the hills clear of all those clouds and mists which usually hover about them. In the clefts of the earth, and in the wells, you will hear a hollow rumbling sound, like the rushing of a great wind. At night the stars seem much larger than usual, and surrounded with a sort of burs. The north-west sky has a black and menacing look; and the sea emits a strong smell, and rises into vast waves, often without any wind. The wind itself now forsakes its usual steady easterly stream, and shifts about to the west; from whence it sometimes blows, with intermissions, violently and irregularly, for about two hours at a time. You have the same signs at the full of the moon. The moon itself is surrounded with a great bur, and sometimes the sun has the same appearance."

Hurricanes produce a most dangerous agitation in the sea, where the waves break and dash against each other with astonishing fury. During their continuance, the vessels which were anchored in the roads frequently cut their cables and put to sea, where they drive at the mercy of the winds and waves, after having struck their yards and top-masts. These destructive phænomena are now thought to arise from electricity, though the manner in which it acts in this case is by no means known. It seems probable, indeed, that not only hurricanes, but even the most gentle gales of wind, are produced by the action of the electric fluid; for which see the articles **WIND**, **WHIRLWIND**, &c.

HURST, **HYRST**, or **HERST**, are derived from the Saxon *hyrst*, i. e. a wood, or grove of trees. There are many places in Kent, Sussex, and Hampshire, which begin and end with this syllable; and the reason may be, because the great wood called *Andrefswald* extended through those countries.

HURST-CASTLE, a fortress of Hampshire in England, not far from Limington. It is seated on the extreme point of a neck of land which shoots into the sea, towards the isle of Wight, from which it is distant two miles.

HUSBAND, a man joined or contracted with a woman in marriage. See **MARRIAGE**.

HUSBANDRY, the business or employment of a farmer, or person who cultivates land. See **AGRICULTURE**.

HUSK, the same with what botanists call the *calix* or *cup* of a flower. See **CALIX**.

HUSO, in ichthyology. See **ACCIPENSER**.

HUSS (John), a celebrated divine and martyr, born at Hussenitz in Bohemia, in 1376. He was liberally educated in the university of Prague, and in 1400 was made minister of the church of Bethlehem in that city. He adopted the opinions of Wickliffe, and preached with great zeal against the errors of the church of Rome; for which he was sentenced to the stake by the council of Constance, in 1415. He was burned with much formality, after having been degraded; and his ashes were thrown into the Rhine. His writings, which are numerous and learned, were collected into a body, on the invention of **PRINTING**.

HUSSARS, are the national cavalry of Hungary and Croatia. Their regimentals consist in a rough furred cap, adorned with a cock's feather, (the officers either an eagle's, or a heron's;) a doublet, with a pair of breeches to which the stockings are fastened, and yellow or red boots: besides, they occasionally wear a short upper waistcoat edged with furs, and five rows of round metal-buttons; and in bad weather, a cloak. Their arms are a sabre, carbine, and pistols. They are irregular troops: hence, before beginning an attack, they lay themselves so flat on the necks of their horses, that it is hardly possible to discern their force; but, being come within pistol-shot of the enemy, they raise themselves with such surprising quickness, and begin the fight with such vivacity on every side, that, unless the enemy is accustomed to their method of engaging, it is very difficult for troops to preserve their order. When a retreat is necessary, their horses have so much fire, and are so indefatigable, their equipage so light, and themselves such excellent horsemen, that no other cavalry can pretend to follow them. They leap over ditches, and swim over rivers, with surprising facility. They never encamp, and consequently are not burthened with any camp-equipage, saving a kettle and a hatchet to every six men. They always lie in the woods, out-houses, or villages, in the front of the army. The emperor, queen of Hungary, and king of Prussia, have the greatest number of troops under this name in their service.

HUSSITES, the followers of John Huss, who was burnt for heresy. See **HUSS**.

It is evident in what the pretended heresy of John Huss and Jerome of Prague consisted, from the answer they made to the council, when they were admonished to conform to the sentiments of the church. "They were lovers (they said) of the holy gospel, and sincere disciples of Jesus Christ: that the church of Rome, and all other churches in the world, were widely departed from the apostolical tradition; that the clergy ran after riches and pleasures, lorded it over the people, affected the highest seats at entertainments, bred horses and dogs; and the revenues of the church, which belonged to the poor members of Christ, were consumed in vanity and wantonness: and that the priests were ignorant of the commands of God, or, if they did know them, paid but little regard to them."

Undimmed by the fate of their leader, the Hussites not only stuck to his doctrines, but, choosing John Zisca for their chief in Bohemia, they maintained a war for a long time against the emperor Sigismund with great success; and Procopius Holy, another of their leaders, conducted them with equal courage. The Hussites spread over all Bohemia and Hungary, and even Silesia and Poland; and there are some remains of them still subsisting in all these parts. The followers of Huss were also called *Calixtins*, *Taberites*, and *Bohemian Brethren*.

HUSTINGS (from the Saxon word *Husting*, i. e. *concilium*, or *curia*), a court held in Guild-hall before the lord-mayor and aldermen of London, and reckoned the supreme court of the city. Here deeds may be inrolled, outlawries sued out, and replevins and writs of error determined. In this court also is the election of aldermen, of the four members of parliament for the city, &c. This court is very ancient, as appears by the laws of Edward the Confessor. Some other cities have likewise had a court bearing the same name, as Winchester, York, &c.

HUSUM, a town of Denmark, in the duchy of Sleswick, and capital of a bailiwick of the same name, with a strong citadel, and a very handsome church. It is seated near the river Ow, on the German Sea; and is subject to the dukes of Holstein-Gottorp. E. Long. 9. 5. N. Lat. 54. 55.

HUTCHESON (Dr Francis), a very elegant writer and excellent philosopher, was the son of a dissenting minister in the north of Ireland, and was born on the 8th of August 1694. He early discovered a superior capacity; and having gone through a school-education, began his course of philosophy at an academy, whence he removed to the university of Glasgow, where he applied himself to all the parts of literature, in which his progress was suitable to his uncommon abilities.

He then returned to Ireland; and entering into the ministry, was just about to be settled in a small congregation of dissenters in the north of Ireland, when some gentlemen about Dublin, who knew his great abilities and virtues, invited him to take up a private academy there. He complied with the invitation, and met with much success. He had been fixed but a short time in Dublin, when his singular merits and accomplishments made him generally known; and his acquaintance was sought by men of all ranks, who had any taste for literature, or any regard for learned men. The late lord viscount Moleworth is said to have taken great pleasure in his conversation, and to have assisted him with his criticisms and observations upon his "Inquiry into the ideas of beauty and virtue," before it came abroad. He received the same favour from Dr Syngé, lord bishop of Elphin, with whom he also lived in great friendship. The first edition of this performance came abroad without the author's name, but the merit of it would not suffer him to be long concealed. Such was the reputation of the work, and the ideas it had raised of the author, that lord Granville, who was then lord lieutenant of Ireland, sent his private secretary to inquire at the bookseller's for the author; and when he could not learn his name, he left a letter to be conveyed to him: in consequence of which he soon became acquainted with

his

Hutchinson, his excellency, and was treated by him, all the time he continued in his government, with distinguishing marks of familiarity and esteem.

From this time his acquaintance began to be still more courted by men of distinction either for station or literature in Ireland. Archbishop King, the author of the celebrated book *De origine mali*, held him in great esteem; and the friendship of that prelate was of great use to him in screening him from two several attempts made to prosecute him, for daring to take upon him the education of youth, without having qualified himself by subscribing the ecclesiastical canons, and obtaining a licence from the bishop. He had also a large share in the esteem of the primate Bolter, who through his influence made a donation to the university of Glasgow of a yearly fund for an exhibitioner to be bred to any of the learned professions. A few years after his "Inquiry into the ideas of Beauty and Virtue," his "Treatise on the Passions" was published: both these works have been often reprinted; and always admired, both for the sentiment and language, even by those who have not assented to the philosophy of them, nor allowed it to have any foundation in nature. About this time he wrote some philosophical papers, accounting for laughter, in a different way from Hobbes, and more honourable to human nature: which papers were published in the collection called *Hibernicus's Letters*.

After he had taught in a private academy at Dublin for seven or eight years with great reputation and success, he was called, in the year 1729, to Scotland, to be a professor of philosophy in the university of Glasgow. Several young gentlemen came along with him from the academy, and his high reputation drew many more thither both from England and Ireland. Here he spent the remainder of his life in a manner highly honourable to himself, and ornamental to the university of which he was a member. His whole time was divided between his studies and the duties of his office; except what he allotted to friendship and society. A firm constitution and a pretty uniform state of good health, except some few slight attacks of the gout, seemed to promise a longer life; yet he did not exceed the 53d year of his age. He was married, soon after his settlement in Dublin, to Mrs Mary Wilson a gentleman's daughter in the county of Langford; by whom he left behind him one son, Francis Hutchinson, doctor of medicine. By this gentleman was published, from the original manuscript of his father, "A System of Moral Philosophy, in three books, by Francis Hutchinson, LL.D. at Glasgow, 1755," in two volumes, 4to.

HUTCHINSON (John), a philosophical writer, whose notions have made no inconsiderable noise in the world, was born in 1674. He served the duke of Somerset in the capacity of steward; and in the course of his travels from place to place employed himself in collecting fossils: we are told, that the large and noble collection bequeathed by Dr Woodward to the university of Cambridge, was actually made by him, and even unfairly obtained from him. When he left the duke's service to indulge his studies with more freedom, the duke, then master of the horse to George I. made him his riding surveyor, a kind of sinecure place of 200l. a-year with a good house in the Meuse. In

1724 he published the first part of *Moses's Principia*, in which he ridiculed Dr Woodward's Natural History of the Earth, and exploded the doctrine of gravitation established in Newton's Principia: in 1727, he published the second part of *Moses's Principia*, containing the principles of the Scripture philosophy. From this time to his death, he published a volume every year or two, which, with the MSS. he left behind, were published in 1748, in 12 vols. 8vo. On the Monday before his death, Dr Mead urged him to be bled; saying pleasantly, "I will soon fend you to *Moses*," meaning to his studies: but Mr Hutchinson taking it in the literal sense, answered in a muttering tone, "I believe, doctor, you will;" and was so displeased, that he dismissed him for another physician; but died a few days after, August 28th 1737. Singular as his notions are, they are not without some defenders, who have obtained the appellation of *Hutchinsonians*.

HUY, a town of the Netherlands in the bishopric of Liege, and capital of Condras. It is advantageously seated on the river Maese, over which there is a bridge. E. Long. 10. 22. N. Lat. 52. 31.

HUYGENS (Christian), one of the greatest mathematicians and astronomers of the 17th century, was the son of Constantine Huygens, lord of Zuylichem, who had served three successive princes of Orange in the quality of secretary; and was born at the Hague, in 1629. He discovered from his infancy an extraordinary fondness for the mathematics; in a little time made a great progress in them; and perfected himself in those studies under the famous professor Schooten, at Leyden. In 1649, he went to Holstein and Denmark, in the retinue of Henry count of Nassau; and was extremely desirous of going to Sweden, in order to see Des Cartes, but the count's short stay in Denmark would not permit him. He travelled into France and England; was, in 1663, made a member of the Royal Society; and, upon his return into France, M. Colbert, being informed of his merit, settled a considerable pension upon him to engage him to fix at Paris; to which Mr Huygens consented, and staid there from the year 1666 to 1681, where he was admitted a member of the Academy of Sciences. He loved a quiet and studious manner of life, and frequently retired into the country to avoid interruption, but did not contract that moroseness which is so frequently the effect of solitude and retirement. He was the first who discovered Saturn's ring, and a third satellite belonging to that planet, which had hitherto escaped the eyes of astronomers. He discovered the means of rendering clocks exact, by applying the pendulum, and rendering all its vibrations equal by the cycloid. He brought telescopes to perfection, made many other useful discoveries, and died at the Hague in 1695. He was the author of several excellent works. The principal of these are contained in two collections; the first of which was printed at Leyden in 1682, in quarto, under the title of *Opera varia*; and the second at Amsterdam in 1728, in two volumes quarto, intitled *Opera reliqua*.

HYACINTH, in natural history, a genus of pelucid gems, whose colour is red with an admixture of yellow.

The hyacinth, though less striking to the eye than
21 M 2 any

Huy
Hyacinth.

Hyacinth.
Hyacinthus

any other red gems, is not without its beauty in the finest specimens. It is found of various sizes, from that of a pin's head to the third of an inch in diameter. Like common crystal, it is sometimes found columnar, and sometimes in a pebble-form; and is always hardest and brightest in the larger masses.

Its colour is a dull or deadish red, with an admixture of yellow in it; and this mixed colour is found in all the variety of tints that a prevalence of the red or of the yellow in different degrees is capable of giving it.

Our jewellers allow all those gems to be hyacinths or jacinths, that are of a due hardness with this mixed colour; and as they are of very different beauty and value in their several degrees and mixture of colours, they divide them into four kinds; three of which they call *hyacinth*, but the fourth, very improperly, a *rub*. *1.* When the stone is in its most perfect state, and of a pure and bright flame-colour, neither the red nor the yellow prevailing, in this state they call it *hyacintha la belle*. *2.* When it has an over-proportion of the red, and that of a dusky colour than the fine high red in the former; and the yellow that appears in a faint degree in it is not a fine, bright, and clear, but a dusky brownish yellow; then they call it the *saffron hyacinth*. *3.* Such stones as are of a dead whitish yellow, with a very small proportion of red in them, they call *amber-hyacinth*. And, *4.* When the stone is of a fine deep red, blended with a dusky and very deep yellow, they call it a *rubacelle*. But though the over-proportion of a strong red in this gem has made people refer it to the class of rubies, its evident mixture of yellow shews that it truly belongs to the hyacinths.

The hyacinth *la belle* is found both in the East and West Indies. The oriental are the harder, but the American are often equal to them in colour. The *rubacelle* is found only in the East Indies, and is generally brought over among the rubies; but it is of little value: the other varieties are found in Silesia and Bohemia.

HYACINTHUS, **HYACINTH**; a genus of the monogynia order, belonging to the hexandria class of plants. There are six species; of which the most remarkable is the *orientalis*, or eastern hyacinth. Of this there are a great number of varieties, amounting to some hundreds, each of which differs from the rest in some respect or other. This plant hath a large, purplish, bulbous root, sending up several narrow erect leaves eight or ten inches long; the flower-stalk is upright, robust, and succulent, from 10 to 15 inches in height; adorned upward with many large funnel or bell-shaped flowers, swelling at the base, and cut half way into six parts; collected into a large pyramidal spike of different colours in the varieties; flowering in April or May.

These plants are cultivated with the greatest success in Holland, from whence great numbers are annually imported into Britain. Each variety is by the florists distinguished either by the name of the place where first raised, or the person who raised them, or the names of illustrious personages, as of kings, generals, poets, and celebrated ancient historians, gods, goddesses, &c. They are sold by all the seed-dealers. The prices are from three pence per root to five or ten

pounds or more; and some varieties are in such high esteem among the florists, that 20 or 30 *l.* will be given for a single bulb. They are hardy, and will prosper any where, though the fine kinds require a little shelter during the winter. They may be propagated either by seeds or off-sets from the roots.

The properties of a good oriental hyacinth are, a stem perfectly upright; of moderate length, and so strong and well-proportioned that it will sustain the weight of the florets without bending: the florets should be large, swelling below, expanded above, and numerous, 10 or 15 at least, but are often 20 or 30 in number; and should be placed equally round the stem, the pedicles on which they grow longer below than above, diminishing gradually in length upward in such a manner as to represent a pyramid, and each pedicle sufficiently strong to support the florets without drooping. The curious in these plants are careful never to plant the fine sorts two years together in the same bed of earth; for by planting them every year in a fresh bed, the beauty of the flowers is greatly improved.

HYADES, in astronomy, are seven stars in the bull's head, famous among the poets for the bringing of rain. Whence their name *Tades*, from the Greek, *υαδς*, "to rain." The principal of them is in the left eye, by the Arabs called *allebaran*.

The poets feign them the daughters of Atlas and Pleione. Their brother Hyas being torn to pieces by a lioness, they wept his death with such vehemence that the gods, in compassion to them, translated them into heaven, and placed them in the bull's forehead, where they continue to weep; this constellation being supposed to preface rain. Others represent the Hyades as Bacchus's nurses; and the same with the Dodonides, who fearing the resentment of Juno, and flying from the cruelty of king Lycurgus, were translated by Jupiter into heaven.

HYBERNACULUM, in botany, **WINTER-QUARTERS**; defined by Linnæus to be part of the plant which defends the embryo herb from injuries during the severities of the winter. See **BULBUS** and **GEMMA**.

HYBLA (anc. geog.) or **MEGARA**, which last name it took from the Megareans, who led thither a colony; called also *Hybla Parva*, and *Galeotis*. In Strabo's time Megara was extinct, but the name Hybla remained on account of its excellent honey named from it. It was situated on the east coast of Sicily between Syracuse and the Leontines. *Galeota*, and *Megarenseris* the names of the people, who were of a prophetic spirit, being the descendants of Galeus the son of Apollo. *Hybleus* the epithet.—The *Hyblæi colles*, small eminences at the springs of the Alabus near this place, were famous for their variety of flowers, especially thyme; the honey gathered from which was by the ancients reckoned the best in the world, excepting that of Hymettus in Attica. By the moderns it was called *Mel Passi*, for the same reason, namely, on account of its excellent honey, and extraordinary fertility, till it was overwhelmed by the lava of *Ætna*; and having then become totally barren, its name was changed to *Mal Passi*. In a second eruption, by a shower of ashes from the mountain, it soon reassumed its ancient beauty and fertility; and for many years was called *Bel*

Paffi: and last of all, in the year 1669, it was again laid under an ocean of fire, and reduced to the most wretched sterility; since which time it is again known by the appellation of *Mal Paffi*. However, the lava in its course over this beautiful country has left several little islands or hillocks, just sufficient to shew what it formerly was. These make a singular appearance in all the bloom of the most luxuriant vegetation, surrounded and rendered almost inaccessible by large fields of black and rugged lava.

HYBLA-Major, (anc. geog.) was situated in the trafficking between mount *Ætna* and the river *Symethus*. In *Paufanias's* time desolate.

HYBLA-Minor, or *Heræa*, (anc. geog.) an inland town of Sicily, situated between the rivers *Oanus* and *Herminius*; now *RAGUSA*.

HYBRIDA PLANTA, a monstrous production of two different species of plants, analogous to a mule among animals. The seeds of hybrid plants will not propagate.

HYÆNA, in zoology. See *CANIS*.

HYÆNIUS LAPIS, in natural history, the name of a stone said to be found in the eyes of the *Hyæna*. *Pliny* tells us, that those creatures were in old times hunted and destroyed for the sake of these stones, and that it was supposed they gave a man the gift of prophecy by being put under his tongue.

HYDATIDES, in medicine, little transparent vesicles or bladders full of water, sometimes found solitary, and sometimes in clusters upon the liver, and various other parts, especially in hydroypical cases.

HYDATOSCOPIA, called also *HYDROMANCY*, a kind of divination or method of foretelling future events by water.

HYDE (Edward), earl of Clarendon, and lord high chancellor of England, was descended from an ancient family in Cheshire, and born at Dinton near Hindon, in Wiltshire, in 1608. He was entered of *Magdalen-hall Oxford*, where, in 1625, he took the degree of A. B. and afterward studied the law in the *Middle-Temple*. In the parliament which begun at *Westminster April 10. 1640*, he served for *Wotton-Basset* in Wiltshire. But that parliament being soon after dissolved, he was chosen for *Salisbury* in *Cornwall* in the long parliament. His abilities were much taken notice of, and he was employed in several committees to examine into divers grievances; but at last being dissatisfied with the proceedings in the parliament, he retired to the king, and was made chancellor of the exchequer, a privy-counsellor, and knight. Upon the declining of the king's cause, he went to France, where, after the death of king *Charles I.* he was sworn of the privy-council to *Charles II.* In 1649, he and the lord *Cottington* were sent ambassadors extraordinary into Spain, and in 1657 he was constituted lord high chancellor of England. The year before the restoration, the duke of *York* falling in love with *Mrs Anne Hyde*, the lord chancellor's eldest daughter, resolved to marry her, which he performed; but carefully concealed it, both from the king and chancellor. Upon the restoration, he was chosen chancellor of the university of Oxford; and soon after created baron of Hindon, in Wiltshire, viscount *Cornbury* in Oxfordshire, and earl of *Clarendon* in Wiltshire; and, on the death of *Henry lord Falkland*, was made lord lieute-

nant of Oxfordshire. He took care neither to load the king's prerogative, nor encroach upon the liberties of the people; and therefore would not set aside the petition of right, nor endeavour to raise the star-chamber or high-commission courts again: nor did he attempt to repeal the bill for triennial parliaments; and when he might have obtained two millions for a standing revenue, he asked but one million two hundred thousand pounds *per annum*, which he thought would still put the king upon the necessity of having recourse to his parliament. In this just conduct he is said to have been influenced by the following incident, which happened some years before. When he first began to grow eminent in the law, he went down to visit his father in Wiltshire; who, one day as they were walking in the fields together, observed to him, that men of his profession were apt to stretch the prerogative too far, and to injure liberty; but charged him, if ever he came to any eminence in his profession, never to sacrifice the laws and liberty of his country to his own interest or the will of his prince: he repeated his advice twice; and immediately falling into a fit of an apoplexy, died in a few hours: and this circumstance had a lasting influence upon him. In 1662, he opposed a proposal for the king's marriage with the infant of Portugal, and the sale of *Dunkirk*: however, the following year, articles of high treason were exhibited against him by the earl of *Bristol*; but they were rejected by the house of lords. In 1664, he opposed the war with Holland. In August 1667, he was removed from his post of lord chancellor; and in November following impeached of high treason and other crimes and misdemeanors by the house of commons: upon which he retired into France, when a bill was passed for banishing him from the king's dominions. See *BRITAIN*, n^o 217, 217. He resided at *Rouen* in Normandy; and dying there in 1674, his body was brought to England and interred in *Westminster-abbey*. He wrote, 1. A history of the rebellion, 3 vols folio, and 6 vols octavo; a second part of which was lately bequeathed to the public by his lordship's descendant the late lord *Hyde* and *Cornbury*. 2. A letter to the duke of *York*, and another to the duchess of *York*, upon occasion of their embracing the *Romish* religion. 3. An answer to *Hobbes's Leviathan*. 4. A history of the rebellion and civil wars in Ireland, octavo; and some other works.

The reverend Mr *Granger*, in his *Biographical History of England*, observes, that "the virtue of the earl of Clarendon was of too stubborn a nature for the age of *Charles II.* Could he have been content, (says he,) to have enslaved millions, he might have been more a monarch than an unprincipled king. But he did not only look upon himself as the guardian of the laws and liberties of his country, but had also a pride in his nature that was above vice; and chose rather to be a victim himself, than to sacrifice his integrity. He had only one part to act, which was that of an honest man. His enemies allowed themselves a much greater latitude; they loaded him with calumnies, blamed him even for their own errors and misconduct, and helped to ruin him by such buffooneries as he despised. He was a much greater, perhaps a much happier man, alone and in exile, than *Charles the Second* upon his throne."

Hyde.

And the following character of this nobleman is given by Mr Walpole. "Sir Edward Hyde, (says he), who opposed an arbitrary court, and embraced the party of an afflicted one, must be allowed to have acted conscientiously. A better proof was his behaviour on the restoration, when the torrent of an insatuated nation intreated the king and his minister to be absolute. Had Clarendon sought nothing but power, his power had never ceased. A corrupted court and a blinded populace were left the causes of the chancellor's fall, than an ungrateful king, who could not pardon his lordship's having refused to accept for him the slavery of his country. Like justice herself, he held the balance between the necessary power of the supreme magistrate, and the interests of the people. This never-dying obligation his cotemporaries were taught to overlook and clamour against, till they removed the only man who, if he could, would have corrected his master's evil government. Almost every virtue of a minister made his character venerable. As an historian, he seems more exceptionable. His majesty and eloquence, his power of painting characters, his knowledge of his subject, rank him in the first class of writers; yet he has both great and little faults. Of the latter, his stories of ghosts and omens are not to be defended. His capital fault is his whole work being a laboured justification of king Charles. If he relates faults, some palliating epithet always slides in, and he has the art of breaking his darkest shades with gleams of light that take off all impression of horror. One may pronounce on my lord Clarendon, in his double capacity of statesman and historian, that he acted for liberty, but wrote for prerogative."

HYDE (Dr Thomas), professor of Arabic at Oxford, and one of the most learned writers of the 17th century, was born in 1636; and studied first at Cambridge, and afterwards at Oxford. Before he was 18 years of age, he was sent from Cambridge to London to assist Mr Brian Walton in the great work of the Polyglot Bible; and about that period undertook to transcribe the Persian Pentateuch out of the Hebrew characters, which archbishop Usher, who well knew the difficulty of the undertaking, pronounced to be an impossible task to a native Persian. After he had happily succeeded in this, he assisted in correcting several parts of Mr Walton's work, for which he was perfectly qualified. He was made archdeacon of Gloucester, canon of Christ-church, head keeper of the Bodleian library, and professor both of Hebrew and Arabic, in the university of Oxford. He was interpreter and secretary of the Oriental languages, during the reigns of Charles II. James II. and William III.; and was perfectly qualified to fill this post, as he could converse in the languages which he understood. There never was an Englishman in his situation of life who made so great a progress; but his mind was so engrossed by his beloved studies, that he is said to have been but ill qualified to appear to any advantage in common conversation. Of all his learned works, (the very catalogue of which, as observed by Anth. Wood, is a curiosity), his *Religio Veterum Perfarum* is the most celebrated. Dr Gregory Sharpe, the late learned and ingenious master of the temple, has collected several of his pieces formerly printed, and republished them, with some additional dissertations, and his

life prefixed, in two elegant volumes quarto. This great man died on the 18th of February, 1702. Among his other works are, 1. A Latin translation of Ulug Beig's observations on the longitude and latitude of the fixed stars; and, 2. A catalogue of the printed books in the Bodleian library.

HYDNUM, in botany; a genus of fungi, belonging to the cryptogamia class of plants. It is of the horizontal kind, echinated or beset with sharp-pointed fibres on its under part. One of the species, named the *imbricatum*, is a native of Britain, and is found in woods. It hath a convex hat, tiled, standing on a smooth pillar, of a pale flesh-colour, with white prickles. It is eaten in Italy, and is said to be of a very delicate taste.

HYDRA, in fabulous history, a serpent in the Marsh of Lerna, in Peloponnesus, represented by the poets with many heads, one of which being cut off, another immediately succeeded in its place, unless the wound was instantly cauterized. Hercules attacked this monster; and having caused Iolaus to hew down wood for flaming brands, as he cut off the heads he applied the brands to the wounds, by which means he destroyed the Hydra.

HYDRA, in astronomy. See there, n° 206.

HYDRAGOGUES, among physicians, remedies which evacuate a large quantity of water in dropsies. The word is formed of *hydr* water, and *agog* to draw or lead; but the application of the term proceeds upon a mistaken supposition, that every purgative had some particular humour which it would evacuate, and which could not be evacuated by any other. It is now, however, discovered, that all strong purgatives will prove *hydragogues*, if given in large quantity, or in weak constitutions. The principal medicines recommended as hydragogues, are the juice of elder, the root of iris, soldanella, mechoacan, jalap, &c.

HYDRANGEA, in botany; a genus of the digynia order, belonging to the decandria class of plants. There is but one species, viz. the arborecens, a native of North America, from whence it hath lately been brought to Europe, and is preserved in gardens, more for the sake of variety than beauty. It rises about three feet high; and hath many soft pithy stalks, garnished with two oblong heart-shaped leaves placed opposite. The flowers are produced at the top of the stalks in a corymbus. They are white, composed of five petals with ten stamina surrounding the style. It is easily propagated by parting the roots; the best time for which is the end of October. The plants thrive best in a moist soil, and require to be sheltered from severe frosts.

HYDRAULICS, the science of the motion of fluids, and the construction of all kinds of instruments and machines relating thereto. See HYDROSTATICS, chap. iv.

HYDRENTEROCELE, in surgery, a species of hernia, wherein the intestines descend into the scrotum, together with a quantity of water.

HYDROCELE, in surgery, denotes any hernia arising from water; but is particularly used for such a one of the serotum, which sometimes grows to the size of one's head, without pain, but exceeding troublesome to the patient. See SURGERY.

HYDROCEPHALUS, a preternatural distension

Hydnum

Hydrocephalus

of the head to an uncommon size by a stagnation and extravasation of the lymph; which, when collected in the inside of the cranium, is then termed *internal*; as that collected on the outside is termed *external*. See (the *Index* subjoined to) MEDICINE.

HYDROCHARIS, the *LITTLE WATER-LILY*; a genus of the decandria order, belonging to the diccia class of plants. There is only one species, a native of Britain, growing in flow streams and wet ditches. It hath kidney-shaped leaves, thick, smooth, and of a brownish green colour, with white blossoms. There is a variety with double flowers of a very sweet smell.

HYDROCOTYLE, *WATER-NAVELWORT*; a genus of the digynia order, belonging to the pentandria class of plants. There are several species, none of which are ever cultivated in gardens. One of them, a native of Britain, growing in marshy grounds, is supposed by the farmers to occasion the rot in sheep. The leaves have central leaf-stalks, with about five flowers in a rundle; the petals are of a reddish white.

HYDROGRAPHY, the art of measuring and describing the sea, rivers, canals, lakes, &c.—With regard to the sea, it gives an account of its tides, counter-tides, soundings, bays, gulphs, creeks, &c.; as also of the rocks, shelves, sands, shallows, promontories, harbours; the distance and bearing of one port from another; with every thing that is remarkable, whether out at sea or on the coast.

HYDROMANCY, a method of divination by water, practised by the ancients. See DIVINATION, n° 7.

HYDROMEL, honey diluted in nearly an equal weight of water. When this liquor has not fermented, it is called *simple hydromel*; and when it has undergone the spirituous fermentation, it is called the *vinous hydromel*, or *mead*.

Honey, like all saccharine substances, vegetable or animal, is susceptible of fermentation in general, and particularly of the spirituous fermentation. To induce this fermentation, nothing is necessary but to dilute it sufficiently in water, and to leave this liquor exposed to a convenient degree of heat. To make good vinous hydromel or mead, the whitest, purest, and best-tasted honey must be chosen; and this must be put into a kettle with more than its weight of water: a part of this liquor must be evaporated by boiling, and the liquor skimmed, till its consistence is such that a fresh egg shall be supported upon its surface without sinking more than half its thickness into the liquor; then the liquor is to be strained and poured through a funnel into a barrel: this barrel, which ought to be nearly full, must be exposed to a heat as equable as is possible, from 20 to 27 or 28 degrees of Mr Reaumur's thermometer, taking care that the bung-hole be slightly covered, but not closed. The phenomena of the spirituous fermentation will appear in this liquor, and will subsist during two or three months, according to the degree of heat; after which they will diminish and cease. During this fermentation, the barrel must be filled up occasionally with more of the same kind of liquor of honey, some of which ought to be kept apart on purpose to replace the liquor which flows out of the barrel in froth. When the fermentation ceases, and the liquor has become very vinous, the barrel is then to be put in a cellar and well closed. A year afterwards the mead

will be fit to be put into bottles.

The vinous hydromel or mead is an agreeable kind of wine: nevertheless it retains long a taste of honey, which is unpleasing to some persons; but this taste it is said to lose entirely by being kept a very long time.

The spirituous fermentation of honey, as also that of sugar, and of the most of vinous liquors, when it is very saccharine, is generally more difficultly effected, requires more heat, and continues longer than that of ordinary wines made from the juice of grapes; and these vinous liquors always preserve a saccharine taste, which shews that a part only of them is become spirituous.

HYDROMETER, an instrument to measure the gravity, density, velocity, force, &c. of water and other fluids. See **HYDROSTATICS**, n° 13.

HYDROMPHALUS, in medicine and surgery, a tumour in the navel, arising from a collection of water.

HYDROPHANE, in natural history: A genus of semi-pellucid gems, composed of crystal and earth; the latter ingredient being in large proportion, and mixed imperfectly, as in the chalcodony; and giving a general cloudiness or mistiness to the stone; but of such an imperfect and irregular admixture, as not to be capable of a polish like the chalcodony; and appearing of a dusky and foul surface till thrown into water, in which they become lucid and in some degree transparent, either in part or totally; also changing their colour, which returns to them on their being taken out of the water. To this genus belongs the oculus beli of authors, or whitish grey hydrophanes variegated with yellow, and with a black central nucleus; and the oculus mundi, or lapis mutabilis, which is likewise a whitish grey kind without veins.

HYDROPHOBIA, an aversion or dread of water: a terrible symptom of the *rabies canina*; and which has likewise been found to take in violent inflammations of the stomach and in hysterical fits. See (the *Index* subjoined to) MEDICINE.

HYDROPHYLACIA, a word used by Kircher and some others who have written in the same system, to express those great reservoirs of water which lie places in the Alps and other mountains for the supply of rivers which run through the several lower countries. This he makes to be one of the great uses of mountains in the œconomy of the universe.

HYDROPHYLLUM, *WATER-LEAF*; a genus of the monogynia order, belonging to the pentandria class of plants. There is only one species, viz. the Virginianum, or water-leaf of Morinus. It grows naturally in Canada and many other parts of America on moist spongy ground. The root is composed of many strong fleshy fibres, from which arise many leaves with footstalks five or six inches long, jagged into three, five, or seven lobes, almost to the midrib, indented on their edges. The flowers are produced in loose clusters hanging downward, are bell-shaped, and of a dirty white colour. It may be propagated by parting the roots; which ought to be done in autumn, that the plants may be well rooted before spring, otherwise they will require a great deal of water.

HYDROPS, in medicine, the same with **DRÖPSY**.

HYDROSCOPE, an instrument anciently used for the measuring of time.

The hydrocope was a kind of water-clock, consisting

Hydrometer

Hydroscope

ing of a cylindrical tube, conical at bottom: the cylinder was graduated, or marked out with divisions, to which the top of the water becoming successively

contiguous, as it trickled out at the vertex of the cone, pointed out the hour. See HYDROSTATICS, n° 41, 42.

Its nature and properties.

H Y D R O S T A T I C S;

A SCIENCE which treats of the weight, motion, and equilibria of liquid bodies. Under this head, not only accounts of the nature and properties of fluids in general are introduced, and the laws by which they act; but also the art of weighing solid bodies in fluids, in order to discover their specific gravities.

SECT. I. *Of FLUIDS in general.*

Fluid defined, &c.

SIR Isaac Newton's definition of a fluid is, That it is a body yielding to any force impressed, and which hath its parts very easily moved one among another. See FLUIDITY.

This definition supposes the motion spoken of produced by a partial pressure; for in the case of an incompressible fluid, it is demonstrated by Dr Keil, that under a total or an equal pressure, it would be impossible that the yielding body should move.

The original and constituent parts of fluids are by the moderns conceived to be particles small, smooth, hard, and spherical: according to which opinion, every particle is of itself a solid, or a fixed body; and, when considered singly, is no fluid, but becomes so only by being joined with other particles of the same kind. From this definition, it hath been concluded by some philosophers, that some substances, such as mercury, are essentially fluid, on account of the particular configuration of their particles; but later discoveries have evinced the fallacy of this opinion, and that fluidity is truly to be reckoned an effect of heat. See FLUIDITY.

That fluids have vacuities, will appear upon mixing salt with water, a certain quantity whereof will be dissolved, and thereby imbibed, without enlarging the dimensions. A fluid's becoming more buoyant, is a certain proof that its specific gravity is increased, and of consequence that many of its vacuities are thereby filled: after which it may still receive a certain quantity of other dissoluble bodies, the particles whereof are adapted to the vacancies remaining, without adding any thing to its bulk, though the absolute weight of the whole fluid be thereby increased.

This might be demonstrated, by weighing a phial of rain-water critically, with a nice balance: pour this water into a cup, and add salt to it; refund of the clear liquor what will again fill the phial; an increase of weight will be found under the same dimensions, from a repletion, as has been said, of the vacuities of the fresh water with saline particles.

And as fluids have vacuities, or are not perfectly dense; it is also probable, that they are compounded of small spheres of different diameters, whose interstices may be successively filled with apt materials for that purpose: and the smaller these interstices are, the greater will the gravity of the fluid always be.

For instance, suppose a barrel be filled with bullets in the most compact manner, a great many small-shot may afterwards be placed in the interstices of those

balls; the vacuities of the shot may then be replenished with a certain quantity of sea-sand; the interstices of the grains of the sand may again be filled with water; and thus may the weight of the barrel be greatly augmented, without increasing the general bulk.—Now this being true with regard to solids, is applicable also to fluids. For instance, river-water will dissolve a certain quantity of salt; after which it will receive a certain quantity of sugar; and after that, a certain quantity of alum, and perhaps other dissoluble bodies, and not increase its first dimensions.

The more perfect a fluid is, the more easily will it yield to all impressions, and the more easily will the parts unite and coalesce when separated. A perfect fluid is that whose parts are put into motion by the *least* force imaginable: an imperfect one is that whose parts yield to a *small* force, not the *least*. It is probable, that in nature there is no perfect fluid, the element of fire perhaps excepted; since we see that the mutual attraction of the parts of all the fluids, subject to our experiments, renders them cohesive in some degree; and the more they cling together, the less perfect their fluidity is. If, for instance, a glass be filled with water above the brim, it will visibly rise to a convex surface, which, was it a perfect fluid, free from either tenacity or cohesion, would be impossible.

Mercury, the most perfect fluid we know, is not exempt from this attraction; for, should the bottom of a flat glass, having a gentle rising toward the middle, be covered thin with quicksilver, a little motion of the machine will cause the fluid soon to separate from the middle, and lie round it like a ring, having edges of a considerable thickness.

But if a like quantity thereof be poured into a golden cup, it will, on the contrary, appear higher considerably on the sides than in the middle. Which may proceed in part, perhaps, from the gold's being of great density, and therefore capable of exerting thereon a greater degree of attraction than other metals. Probably too it may happen from its having pores of an apter disposition and magnitude to receive the minute mercurial particles, than those of iron and some other metals; and therefore the attraction of cohesion in this experiment may obtain also: and every one knows how easily these two bodies incorporate, and make a perfect *amalgama*. But the reason commonly given for the two phenomena is, that mercury, in the first case, attracts itself more than it does glass; and, in the last case, mercury attracts gold more than it does itself.

SIR Isaac Newton held all matter to be originally homogeneous; and that from the different modifications and texture of it alone, all bodies receive their various structure, composition, and form. In his definition of a fluid, he seems to imply, that he thought fluids to be composed of primary solids; and, in the beginning of his *Principia*, he speaks of sand and powders as of imperfect fluids.

Pressure of fluids.

3
Florentine experiment.

Borrelli has demonstrated, that the constituent parts of fluids are not fluid, but consistent bodies; and that the elements of all bodies are perfectly firm and hard. The incompressibility of water, proved by the Florentine experiment, is a sufficient evidence also, that each primary particle or spherule thereof is a perfect and impenetrable solid. Mr Locke too, in his *Essay on Human Understanding*, admits this to be so.

This famous experiment was first attempted by the great lord Verulam, who inclosed a quantity of water in lead, and found that it inclined rather to make its way through the pores of the metal, than be reduced into less compacts by any force that could be applied. The academics of Florence made this experiment afterwards more accurately with a globe of silver, as being a metal less yielding and ductile than gold. This being filled with water, and well closed, they found, by hammering gently thereon, that the sphericity of the globe was altered to a less capacious figure (as might geometrically be proved); but a part of the water always like dew came through its sides before this could be obtained. This has been attempted by Sir Isaac Newton, and so many competent judges, on gold and several other metals since, with equal success, that we do not hold any fluid in its natural state, except the air, to be either compressible or elastic.—In some experiments by Mr Canton, it hath been observed, that water is more or less compressed according to the different constitution of the atmosphere; whence it hath been concluded that the Florentine experiment was erroneous: but it will not follow, that water can be compressed by any artificial force, because nature hath a method of compressing it; any more than that solid metal can be compressed artificially, though we know that very slight degrees of heat and cold will expand or contract its dimensions. See WATER.

SECT. II. Of the Gravity and Pressure of Fluids.

4
Fluids press as much upward as downward.

ALL bodies, both fluid and solid, press downwards by the force of gravity: but fluids have this wonderful property, that their pressure upwards and sideways is equal to their pressure downwards; and this is always in proportion to their perpendicular height, without any regard to their quantity: for, as each particle is quite free to move, it will move towards that part or side on which the pressure is least. And hence, no particle or quantity of a fluid can be at rest, till it is every way equally pressed.

Plate CLII.
fig. 2.

To shew by experiment that fluids press upward as well as downward, let AB be a long upright tube filled with water near to its top; and CD a small tube open at both ends, and immersed into the water in the large one: if the immersion be quick, you will see the water rise in the small tube to the same height that it stands in the great one, or until the surfaces of the water in both are on the same level: which shews that the water is pressed upward into the small tube by the weight of what is in the great one; otherwise it could never rise therein, contrary to its natural gravity; unless the diameter of the bore were so small, that the attraction of the tube would raise the water; which will never happen, if the tube be as wide as that in a common barometer. And, as the water rises no higher in the small tube than till its

surface be on a level with the surface of the water in the great one, this shews that the pressure is not in proportion to the quantity of water in the great tube, but in proportion to its perpendicular height therein: for there is much more water in the great tube all around the small one, than what is raised to the same height in the small one as it stands in the great.

Take out the small tube, and let the water run out of it; then it will be filled with air. Stop its upper end with the cork C, and it will be full of air all below the cork: this done, plunge it again to the bottom of the water in the great tube, and you will see the water rise up in it to the height E. Which shews that the air is a body, otherwise it could not hinder the water from rising up to the same height as it did before, namely, to A; and in so doing, it drove the air out at the top; but now the air is confined by the cork C: And it also shews that the air is a compressible body; for if it were not so, a drop of water could not enter into the tube.

The pressure of fluids being equal in all directions, it follows, that the sides of a vessel are as much pressed by a fluid in it, all around in any given ring of points, as the fluid below that ring is pressed by the weight of all that stands above it. Hence the pressure upon every point in the sides, immediately above the bottom, is equal to the pressure upon every point of the bottom.—To shew this by experiment, let a hole be made at *e* Fig. 3. in the side of the tube AB close by the bottom; and another hole of the same size in the bottom at C; then pour your water into the tube, keeping it full as long as you choose the holes should run, and have two basons ready to receive the water that runs through the two holes, until you think there is an enough in each bason; and you will find by measuring the quantities, that they are equal. Which shews that the water run with equal speed through both holes; which it could not have done, if it had not been equally pressed through them both. For, if a hole of the same size be made in the side of the tube, as about *f*, and if all three are permitted to run together, you will find that the quantity run through the hole at *f* is much less than what has run in the same time thro' either of the holes C or *e*.

In the same figure, let the tube be re-curved from the bottom at C into the shape DE, and the hole at C be stopp'd with a cork. Then, pour water into the tube to any height, as Ag, and it will spout up in a jet EFG, nearly as high as it is kept in the tube AB, by continuing to pour in as much there as runs thro' the hole E; which will be the case whilst the surface Ag keeps at the same height. And if a little ball of cork G be laid upon the top of the jet, it will be supported thereby, and dance upon it. The reason why the jet rises not quite so high as the surface of the water Ag, is owing to the resistance it meets with in the open air: for, if a tube either great or small, was screwed upon the pipe at E, the water would rise in it until the surfaces of the water in both tubes were on the same level; as will be shewn by the next experiment.

Any quantity of a fluid, how small soever, may be made to balance and support any quantity, how great soever. This is deservedly termed the *hydrostatical paradox*; which we shall first shew by an experiment,

5
The hydrostatic paradox.

Pressure
of fluids.

Pressure
of fluids.

Plate
CLII.
fig. 4.

and then account for it upon the principle above mentioned, namely, that the *pressure of fluids is directly as their perpendicular height, without any regard to their quantity.*

Let a small glass tube DCG, open at both ends, and bended at B, be joined to the end of a great one AI at *cd*, where the great one is also open; so that these tubes in their openings may freely communicate with each other. Then pour water through a small necked funnel into the small tube at H; this water will run through the joining of the tubes at *cd*, and rise up into the great tube; and if you continue pouring until the surface of the water comes to any part, as A, in the great tube, and then leave off, you will see that the surface of the water in the small tube will be just as high at D; so that the perpendicular altitude of the water will be the same in both tubes, however small the one be in proportion to the other. This shews, that the small column DCG balances and supports the great column Aed; which it could not do if their pressures were not equal against one another in the recurved bottom at B.—If the small tube be made longer, and inclined in the situation GEF, the surface of the water in it will stand at F, on the same level with the surface A in the great tube: that is, the water will have the same perpendicular height in both tubes, although the column in the small tube is longer than that in the great one; the former being oblique, and the latter perpendicular.

Since then the pressure of fluids is directly as their perpendicular heights, without any regard to their quantities, it appears, that whatever the figure or size of vessels be, if they are of equal heights, and if the areas of their bottoms are equal, the pressures of equal heights of water are equal upon the bottoms of these vessels; even though the one should hold a thousand or ten thousand times as much water as would fill the other. To confirm this part of the hydrostatical paradox by an experiment, let two vessels be prepared of equal heights, but very unequal contents, such as AB fig. 5. and AB in fig. 6. Let each vessel be open at both ends, and their bottoms D *d*, D *d* be of equal widths. Let a brass bottom CC be exactly fitted to each vessel, not to go into it, but for it to stand upon; and let a piece of wet leather be put between each vessel and its brass bottom, for the sake of closeness. Join each bottom to its vessel by a hinge D, so that it may open like the lid of a box; and let each bottom be kept up to its vessel by equal weights E and E hung to lines which go over the pulleys F and F (whose blocks are fixed to the sides of the vessels at *f*) and the lines tied to hooks at *d* and *d*, fixed in brass bottoms opposite to the hinges D and D. Things being thus prepared and fitted, hold the vessel AB (fig. 6.) upright in your hands over a basin on a table, and cause water to be poured into the vessel slowly, till the pressure of the water bears down its bottom at the side *d*, and raises the weight E; and then part of the water will run out at *d*. Mark the height at which the surface H of the water stood in the vessel, when the bottom began to give way at *d*; and then, holding up the other vessel AB (fig. 5.) in the same manner, cause water to be poured into it at H; and you will see, that when the water rises to A in this vessel, just as high as it did in the former, its

bottom will also give way at *d*, and it will lose part of the water.

The natural reason of this surprising phenomenon is, that since all parts of a fluid at equal depths below the surface are equally pressed in all manner of directions, the water immediately below the fixed part B *f* (fig. 5.) will be pressed as much upward against its lower surface within the vessel, by the action of the column A *g*, as it would be by a column of the same height, and of any diameter whatever; (as was evident by the experiment with the tube, fig. 4.) and therefore, since action and reaction are equal and contrary to each other, the water immediately below the surface B *f* will be pressed as much downward by it, as if it was immediately touched and pressed by a column of the height *g* A, and of the diameter B *f*: and therefore, the water in the cavity BD *df* will be pressed as much downward upon its bottom CC, as the bottom of the other vessel (fig. 6.) is pressed by all the water above it.

To illustrate this a little farther, let a hole be made at *f* in the fixed top B *f*, and let a tube G be put into it; then, if water be poured into the tube A, it will (after filling the cavity B *d*) rise up into the tube G, until it comes to a level with that in the tube A; which is manifestly owing to the pressure of the water in the tube A, upon that in the cavity of the vessel below it. Consequently, that part of the top B *f*, in which the hole is now made, would, if corked up, be pressed upward with a force equal to the whole weight of all the water which is supported in the tube G: and the same thing would hold at *g*, if a hole were made there. And so, if the whole cover or top B *f* were full of holes, and had tubes as high as the middle one A *g* put into them, the water in each tube would rise to the same height as it is kept in the tube A, by pouring more into it, to make up the deficiency that it sustains by supplying the others, until they are all full; and then the water in the tube A would support equal heights of water in all the rest of the tubes. Or, if all the tubes except A, or any other one, were taken away, and a large tube equal in diameter to the whole top B *f* were placed upon it and cemented to it, and then if water were poured into the tube that was left in either of the holes, it would ascend through all the rest of the holes, until it filled the large tube to the same height that it stands in the small one, after a sufficient quantity had been poured into it: which shews, that the top B *f* was pressed upward by the water under it, and before any hole was made in it, with a force equal that wherewith it is now pressed downward by the weight of all the water above it in the great tube. And therefore, the reaction of the fixed top B *f* must be as great, in pressing the water downward upon the bottom CC, as the whole pressure of the water in the great tube would have been, if the top had been taken away, and the water in that tube left to press directly upon the water in the cavity BD *df*.

Perhaps the best machine in the world for demonstrating the upward pressure of fluids, is the hydrostatic bellows, which consists of two thick oval boards AB, EF, each about 16 inches broad, and 18 inches long: the sides are of leather, joined very close to the top and bottom by strong nails. CD is a pipe screwed into a piece of brass on the top-board

Fig. 5.

Fig. 5. 6.

6
The hydro-
static bel-
lows, fig. 7.

Pressure of fluids.

Specific gravity.

board at C. Let some water be poured into the pipe at D, which will run into the bellows, and separate the boards a little. Then lay three weights, each weighing 100 pounds, upon the upper board; and pour more water into the pipe, which will run into the bellows, and raise up the board with all the weights upon it; and if the pipe be kept full, until the weights are raised as high as the leather which covers the bellows will allow them, the water will remain in the pipe, and support all the weights, even though it should weigh no more than a quarter of a pound, and they 300 pounds: nor will all their force be able to cause them to descend and force the water out at the top of the pipe.

The reason of this will be made evident, by considering what has been already said of the result of the pressure of fluids of equal heights without any regard to their quantity. For, if a hole be made in the upper board, and a tube be put into it, the water will rise in the tube to the same height that it does in the pipe; and would rise as high (by supplying the pipe) as in many tubes as the board could contain holes. Now, suppose only one hole to be made in any part of the board, of an equal diameter with the bore of the pipe, and that the pipe holds just a quarter of a pound of water; if a person claps his finger upon the hole, and the pipe be filled with water, he will find his finger to be pressed upward with a force equal to a quarter of a pound. And as the same pressure is equal upon all equal parts of the board, each part, whose area is equal to the area of the hole, will be pressed upward with a force equal to that of a quarter of a pound: the sum of all which pressures against the under side of an oval board 16 inches broad, and 18 inches long, will amount to 300 pounds; and therefore so much weight will be raised up and supported by a quarter of a pound of water in the pipe.

7 How a man may raise himself upward by his breath.

Hence, if a man stands upon the upper board, and blows into the bellows through the pipe, he will raise himself upward upon the board: and the smaller the bore of the pipe is, the easier he will be able to raise himself. And then, by clapping his finger upon the top of the pipe, he can support himself as long as he pleases; provided the bellows be air-tight, so as not to lose what is blown into it.

8 How lead may be made to swim in water. Fig. 8.

Upon this principle of the upward pressure of fluids, a piece of lead may be made to swim in water, by immersing it to a proper depth, and keeping the water from getting above it. Let CD be a glass tube, open at both ends; and EFG a flat piece of lead, exactly fitted to the lower end of the tube, not to go within it, but for it to stand upon; with a wet leather between the lead and the tube, to make close work. Let this leaden bottom be half an inch thick, and held close to the tube by pulling the packthread IHL upward at L with one hand, whilst the tube is held in the other by the upper end C. In this situation, let the tube be immersed in water in the glass vessel AB, to the depth of six inches below the surface of the water at K; and then, the leaden bottom EFG will be plunged to the depth of somewhat more than eleven times its own thickness: holding the tube at that depth, you may let go the thread at L; and the lead will not fall from the tube, but will be kept to it by the upward pressure of the water below it occasioned by the height of the water at K above the level of the

lead. For as lead is 11.33 times as heavy as its bulk of water, and is in this experiment immersed to a depth somewhat more than 11.33 times its thickness, and no water getting into the tube between it and the lead, the column of water EabcG below the lead is pressed upward against it by the water KDEGL all around the tube; which water being a little more than 11.33 times as high as the lead is thick, is sufficient to balance and support the lead at the depth KE. If a little water be poured into the tube upon the lead, it will increase the weight upon the column of water under the lead, and cause the lead to fall from the tube to the bottom of the glass vessel, where it will lie in the situation b d. Or, if the tube be raised a little in the water, the lead will fall by its own weight, which will then be too great for the pressure of the water around the tube upon the column of water below it. But the following method of making an extremely heavy body float upon water is more elegant. Take a long glass tube, open at both ends; stopping the lower end with a finger, pour in some quicksilver at the other end, so as to take up about half an inch in the tube below. Immerse this tube, with the finger still at the bottom, in a deep glass vessel filled with water; and when the lower end of the tube is about seven inches below the surface, take away the finger from it, and then you will see the quicksilver not sink into the vessel, but remain suspended upon the tube, and floating, if we may so express it, upon the water in the glass-vessel.

In the same manner as an heavy body was made to swim on water, by taking away the upward pressure; so may a light body, like wood, be made to remain sunk at the bottom, by depriving it of all pressure from below: for if two equal pieces of wood be planed, surface to surface, so that no water can get between them, and then one of them (cd) be cemented to the inside of the vessel's bottom; then the other being placed upon this, and, while the vessel is filling, being kept down by a stick; when the stick is removed and the vessel full, the upper piece of wood will not rise from the lower one, but continue sunk under water, though it is actually much lighter than water; for as there is no resistance to its under surface to drive it upward, while its upper surface is strongly pressed down, it must necessarily remain at the bottom.

9 How light wood may be made to lie at the bottom of water.

SECT. III. Of the Specific Gravity of Bodies.

WHEN an unspungy or solid body sinks in a vessel of water, it removes a body of water equal to its own bulk, out of the place to which it descends. If, for instance, a copper ball is let drop into a glass of water, we well know, that if it sinks, it will take up as much room as a globe of water equal to itself in size took up before.

Let us suppose, that this watery globe removed by the ball were frozen into a solid substance, and weighed in a scale against the copper ball: now the copper ball being more in weight than the globe, it is evident that it will sink its own scale, and drive up the opposite, as all heavier bodies do when weighed against lighter; if, on the contrary, the copper ball be lighter than the water globe, the ball will rise. Again, then, let us suppose the copper ball going to be immersed in water; and that, in order to descend, it must displace a globe of water equal to itself in bulk. If the copper ball be heavier than the globe, its pressure will overcome the other's resistance, and it will sink to the bot-

10 Specific gravity.

Specific
gravities.Specific
gravities.

tom; but if the watery globe be heavier, its preffure upwards will be greater than that of the ball downward, and the ball will rise or swim. In a word, in proportion as the ball is heavier than the similar bulk of water, it will defend with greater force; in proportion as it is lighter, it will be raised more to the surface.

From all this we may deduce one general rule, which will measure the force with which any solid body tends to swim or sink in water; namely, *Every body immersed in water, loses just as much of its weight as equals the weight of an equal bulk of water.* Thus, for instance, if the body be two ounces, and an equal bulk of water be one ounce, the body when plunged will sink towards the bottom of the water with a weight of one ounce. If, on the contrary, the solid body be but one ounce, and the weight of an equal bulk of water be two ounces; the solid, when plunged, will remove but one ounce, that is, half as much water as is equal to its own bulk: so that, consequently, it cannot defend; for to do that, it must remove a quantity of water equal to its own bulk. Again, if the solid be two ounces, and the equal bulk of water two ounces, the solid, wherever it is plunged, will neither rise nor sink, but remain suspended at any depth.

Thus we see the reason why some bodies swim in water, and others sink. Bodies of large bulk and little weight, like cork or feathers, must necessarily swim, because an equal bulk of water is heavier than they; bodies of little bulk but great weight, like lead or gold, must sink, because they are heavier than an equal bulk of water. The bulk and the weight of any body considered together, is called its *specific gravity*; and the proportion of both in any body is easily found by water. A body of little bulk and great weight, readily sinks in water, and it is said to have *specific gravity*; a body of great bulk and little weight, loses almost all its weight in water, and therefore is said to have but little *specific gravity*. A woolpack has actually greater real gravity, or weighs more in air, than a cannon ball; but for all that, a cannon ball may have more *specific gravity*, and weigh more than the woolpack, in water. *Density* is a general term that means the same thing; *specific gravity* is only a relative term, used when solids are weighed in fluids, or fluids in fluids.

As every solid sinks more readily in water, in proportion as its *specific gravity* is great, or as it contains greater weight under a smaller bulk, it will follow, that the same body may very often have different *specific gravities*, and that it will sink at one time and swim at another. Thus a man, when he happens to fall alive into the water, sinks to the bottom; for the *specific gravity* of his body is then greater than that of water: but if, by being drowned, he lies at the bottom for some days, his body swells by putrefaction, which diffuses its parts; thus its *specific gravity* becomes less than that of water, and he floats upon the surface.

Several more important uses are the result of our being able exactly to determine the *specific gravities* of bodies. We can, by weighing metals in water, discover their adulterations or mixtures with greater exactness than by any other means whatsoever. By this means, the counterfeit coin, which may be offered us as gold, will be very easily distinguished, and

known to be a baser metal. For instance, if we are offered a brass counter for a guinea, and we suspect it; suppose, to clear our suspicions, we weigh it in the usual manner against a real guinea in the opposite scale, and it is of the exact weight, yet still we suspect it; What is to be done? To melt or destroy the figure of the coin would be inconvenient and improper: a much better and more accurate method remains. We have only to weigh a real guinea in water, and we shall thus find that it loses but a nineteenth part of its weight in the balance: We then weigh the brass counter in water, and we actually find it loses an eighth part of its weight by being weighed in this manner. This at once demonstrates, that the coin is made of a base metal, and not gold; for as gold is the heaviest of all metals, it will lose less of its weight by being weighed in water than any other.

This method Archimedes first made use of to detect a fraud with regard to the crown of Hiero king of Syracuse. Hiero had employed a goldsmith to make him a crown, and furnished him with a certain weight of gold for that purpose; the crown was made, the weight was the same as before, but still the king suspected that there was an adulteration in the metal. Archimedes was applied to; who, as the story goes, was for some time unable to detect the imposition. It happened, however, one day as the philosopher was stepping into a bath, that he took notice the water rose in the bath in proportion to the part of his body immersed. From this accident he received a hint; wherewith he was so transported, that he jumped out of the bath, and ran naked about the streets of Syracuse, crying in a wild manner, *I have found it! I have found it!*—In consequence of this speculation, he made two masses of the just weight of the crown; one of gold, the other of silver. These he severally let down carefully into a vessel of water, wherein the rise of the fluid might easily be determined by measure. Being of different *specific gravities*, they were consequently of different magnitudes, and on immersion took up the room of different quantities of water; by comparing whereof with their absolute gravities in the air, he became fully master of the relation, in point of weight, each of these metals had to water, and consequently to each other. He then served the crown in like manner; and by comparing his observations, he at length detected the cheat, and fairly assigned the quantities of gold and silver contained in the crown respectively.

Upon this difference in the weight of bodies in open air and water, the hydrostatic balance has been formed; which differs very little from a common balance, but that it hath an hook at the bottom of one scale, on which the weight we want to try may be hung by an horse-hair, and thus suspended in water, without wetting the scale from whence it hangs. First, the weight of the body we want to try is balanced against the parcel or weight in open air; then the body is suspended by the hook and horse-hair at the bottom of the scale in water, which we well know will make it lighter, and destroy the balance. We then can know how much lighter it will be, by the quantity of the weights we take from the scale to make it equipoise; and of consequence we thus precisely can find out its *specific gravity* compared to water (A). This is the most exact

¹²
The hydro-
static bal-
ance.

(A) This is the common hydrostatic balance. The reader will see an improved apparatus at *Hydrostatic BALANCE*, in the order of the alphabet.

¹¹
How to dis-
cover adul-
terations in
metals.

specific
gravity.

Specific
gravities.

exact and infallible method of knowing the genuineness of metals, and the different mixtures with which they may be adulterated, and it will answer for all such bodies as can be weighed in water. As for those things that cannot be thus weighed, such as quicksilver, small sparks of diamond, and such like, as they cannot be suspended by an horse-hair, they must be put into a glass-bucket, the weight of which is already known: this, with the quicksilver, must be balanced by weights in the opposite scale, as before, then immersed, and the quantity of weights to be taken from the opposite scale will shew the specific gravity of the bucket and the quicksilver together: the specific gravity of the bucket is already known; and of consequence the specific gravity of the quicksilver, or any other similar substance, will be what remains.

As we can thus discover the specific gravity of different solids by plunging them in the same fluid, so we can discover the specific gravity of different fluids, by plunging the same solid body into them; for in proportion as the fluid is light, so much will it diminish the weight of the body weighed in it. Thus we may know that spirit of wine has less specific gravity than water, because a solid that will swim in water will sink in spirit; on the contrary, we may know that spirit of nitre has greater specific gravity than water, because a solid that will sink in water will swim upon the spirit of nitre. Upon this principle is made that simple instrument called an *hydrometer*, which serves to measure the lightness or weight of different fluids. For that liquors weigh very differently from each other is found by experience. Suppose we take a glass-vessel which is divided into two parts, communicating with each other by a small opening of a line and an half diameter. Let the lower part be filled up to the division with red wine, then let the upper part be filled with water. As the red-wine is lighter than water, we shall see it in a short time rising like a small thread up through the water, and diffusing itself upon the surface, till at length we shall find the wine and water have changed their places; the water will be seen in the lower half, and the wine in the upper half, of the vessel. Or take a small bottle AB, the neck of which must be very narrow, the mouth not more than $\frac{1}{2}$ of an inch wide; and have a glass-vessel CD, whose height exceeds that of the bottle about two inches. With a small funnel fill the bottle quite full of red-wine, and place it in the vessel CD, which is to be full of water. The wine will presently come out of the bottle, and rise in form of a small column to the surface of the water; and at the same time the water, entering the bottle, will supply the place of the wine; for water being specifically heavier than wine, must hold the lowest place, while the other naturally rises to the top. A similar effect will be produced if the bottle be filled with water, and the vessel with wine: for the bottle being placed in the vessel in an inverted position, the water will descend to the bottom of the vessel, and the wine will mount into the bottle.

In the same manner we may pour four different liquors, of different weights, into any glass-vessel, and they shall all stand separate and unmixed with each other. Thus, if we take mercury, oil of tartar, spirit of wine, and spirit of turpentine, shake them together in a glass, and then let them settle a few minutes,

each shall stand in its proper place, mercury at the bottom, oil of tartar next, spirit of wine, and then spirit of turpentine above all. Thus we see liquors are of very different densities; and this difference it is that the hydrometer is adapted to compare. In general, all vinous spirits are lighter than water; and the less they contain of water, the lighter they are. The hydrometer, therefore, will inform us how far they are genuine, by shewing us their lightness; for in pure spirit of wine it sinks less than in that which is mixed with a small quantity of water.

The hydrometer should be made of copper: for ivory imbibes spirituous liquors, and thereby alters their gravity; and glass requires an attention that is incompatible with expedition. The most simple hydrometer consists of a copper ball B b, to which is soldered a brass wire AB, one quarter of an inch thick. The upper part of this wire being filed flat, is marked *proof*, at m, fig. 2. because it sinks exactly to that mark in proof-spirits. There are two other marks at A and B, fig. 1. to shew whether the liquor be one-tenth above or below proof, according as the hydrometer sinks to A, or emerges to B, when a brass weight, as C or K, is screwed to its bottom c. There are other weights to screw on, which shew the specific gravity of different fluids, quite down to common water.

The round part of the wire above the ball may be marked so as to represent river-water when it sinks to RW, fig. 2. the weight which answers to that water being then screwed on; and when put into spring-water, mineral-water, sea-water, and water of salt springs, it will gradually rise to the marks SP, MI, SE, SA. On the contrary, when it is put into Bristol water, rain-water, port-wine, and mountain-wine, it will successively sink to the marks br, ra, po, mo. Instruments of this kind are sometimes called *areometers*.

There is another sort of hydrometer that is calculated to ascertain the specific gravity of fluids to the greatest precision possible, and which consists of a large hollow ball B, fig. 3. with a smaller ball b screwed on to its bottom, partly filled with mercury or small shot, in order to render it but little specifically lighter than water. The larger ball has also a short neck at C, into which is screwed the graduated brass-wire AC, which, by a small weight at A, causes the body of the instrument to descend in the fluid, with part of the stem.

When this instrument is swimming in the liquor contained in the jar ILMK, the part of the fluid displaced by it will be equal in bulk to the part of the instrument under water, and equal in weight to the whole instrument. Now, suppose the weight of the whole to be four thousand grains, it is then evident we can by this mean compare the different dimensions of four thousand grains of several sorts of fluids. For if the weight at A be such as will cause the ball to sink in rain-water till its surface come to the middle point of the stem 20; and after that, if it be immersed in common spring-water, and the surface be observed to stand at one-tenth of an inch below the middle point 20; it is apparent, that the same weight of each water differs only in bulk by the magnitude of one-tenth of an inch in the stem.

Now, suppose the stem to be ten inches long, and to weigh a hundred grains, then every tenth of an inch will

13
hydro-
er.

te
IV.
7.

Plate
CLIV.
fig. 1.

will weigh one grain: and as the stem is of brafs, which is about eight times heavier than water, the same bulk of water will be equal to one-eighth of a grain, and consequently to the one-eighth of one four-thousandth part, that is, one thirty-two thousandth part of the whole bulk. This instrument is capable of still greater precision, by making the stem or neck consist of a flat thin slip of brafs, instead of one that is cylindrical: for by this means we increase the surface, which is the most requisite circumstance, and diminish the solidity, which necessarily renders the instrument still more accurate.

To adapt this instrument to all purposes, there should be two stems, to screw on and off, in a small hole at *a*. One stem should be a smooth thin slip of brafs, or rather steel, like a watch-spring set straight, similar to that we have just now mentioned; on one side of which is to be the several marks or divisions to which it will sink in different sorts of waters, as rain, river, spring, sea, and salt-spring waters, &c.; and on the other side you may mark the divisions to which it sinks in various lighter fluids, as hot Bath water, Bristol water, Lincomb water, Cheltenham water, port-wine, mountain, madeira, and other sorts of wines. But here the weight at *A* on the top must be a little less than before when it was used for heavier waters.

But in trying the strength of the spirituous liquors, a common cylindric stem will do best, because of its strength and steadiness: and this ought to be so contrived, that, when immersed in what is called proof-spirit, the surface of the spirit may be upon the middle point *20*; which is easily done by duly adjusting the small weight *A* on the top, and making the stem of such a length, that, when immersed in water, it may just cover the ball and rise to *a*; but, when immersed in pure spirit, it may rise to the top *A*. Then, by dividing the upper and lower parts *a 20* and *A 20*, into ten equal parts each, when the instrument is immersed into any sort of spirituous liquor, it will immediately show how much it is above or below proof.

Proof-spirit consists of half water and half pure spirit, that is, such as, when poured on gun-powder, and set on fire, will burn all away; and permits the powder to take fire and flash, as in open air. But if the spirit be not so highly rectified, there will remain some water, which will make the powder wet, and unfit to take fire. Proof-spirit of any kind weighs seven pounds twelve ounces per gallon.

The common method of shaking the spirits in a phial, and raising a head of bubbles, to judge by their manner of rising or breaking whether the spirit be proof, or near it, is very fallacious. There is no way so certain, and at the same time so easy and expeditious, as this by the hydrometer.

Yet, after all, we are not entirely to depend, and with geometrical certainty rely, upon either the hydrometer or the hydrostatic balance; for there are some natural inconveniences that disturb the exactness with which they discover the specific gravities of different bodies. Thus, if the weather be hotter at one time than another, all fluids will swell, and consequently they will be lighter than when the weather is cold: the air itself is at one time heavier than at another, and will buoy up bodies weighed in it; they will therefore appear lighter, and will of consequence

seem heavier in water. In short, there are many causes that would prevent us from making tables of the specific gravities of bodies, if rigorous exactness were only expected; for the individuals of every kind of substance differ from each other, gold from gold, and water from water. In such tables, therefore, all that is expected is to come as near the exact weight as we can; and from an inspection into several, we may make an average near the truth. Thus, Mulchenbroek's table makes the specific gravity of rain-water to be nearly eighteen times and an half less than that of a guinea; whereas our English tables make it to be but seventeen times and an half, nearly, less than the same. But though there may be some minute variation in all our tables, yet they in general may serve to conduct us with sufficient accuracy.

In constructing tables of specific gravities with accuracy, the gravity of water must be represented by unity or 1.000, where three ciphers are added, to give room for expressing the ratios of other gravities in decimal parts, as in the following table.

A TABLE of the SPECIFIC GRAVITIES of several solid and fluid bodies.

A cubic inch of	Troy weight,		Avoirdun.		Compa- rative weight.
	oz.	pw. gr.	oz.	drams.	
Very-fine gold	10	7	3.83	1 5.80	19.637
Standard gold	9	19	6.44	10 14.90	18.888
Guinea gold	9	7	17.18	10 4.76	17.793
Moidore gold	9	0	19.84	9 14.71	17.140
Quicksilver	7	7	11.61	8 1.45	14.019
Lead	5	19	17.55	6 9.08	11.325
Fine silver	5	16	23.23	6 6.66	11.087
Standard Silver	5	11	3.36	6 1.54	10.535
Copper	4	13	7.04	5 1.89	8.843
Plate-brass	4	4	9.60	4 10.09	8.000
Steel	4	2	20.12	4 8.70	7.852
Iron	4	0	15.20	4 6.77	7.645
Block-tin	3	17	5.68	4 3.79	7.321
Spelter	3	14	12.86	4 1.42	7.065
Lead ore	3	11	17.76	3 14.06	6.800
Glass of antimony	2	15	16.89	3 0.89	5.280
German antimony	2	2	4.80	2 5.04	4.000
Copper ore	2	1	11.83	2 4.43	3.775
Diamond	1	15	20.88	1 15.48	3.400
Clear glass	1	13	5.58	1 13.16	3.150
Lapis lazuli	1	12	5.27	1 12.27	3.054
Welch asbestos	1	10	17.57	1 10.97	2.913
White marble	1	8	13.41	1 9.06	2.707
Black ditto	1	8	12.65	1 9.02	2.704
Rock crystal	1	8	1.00	1 8.61	2.658
Green glass	1	7	15.38	1 8.26	2.620
Cornelian stone	1	7	1.21	1 7.73	2.568
Flint	1	6	19.63	1 7.53	2.542
Hard paving-stone	1	5	22.87	1 6.77	2.460
Live sulphur	1	1	2.40	1 2.52	2.000
Nitre	1	0	1.08	1 1.59	1.900
Alabaster	0	19	18.74	1 1.35	1.875
Dry ivory	0	19	6.09	1 0.89	1.825
Brimstone	0	18	23.76	1 0.66	1.800
Alum	0	17	21.02	0 15.72	1.714
Ebony	0	11	18.82	0 10.24	1.600

Table of specific gravities.

lavities.

A cubic inch of	Troy weight.			Avoird.		Compa- rative weight.
	oz.	p.w.	gr.	oz.	dr.	
Human blood	0	11	2.89	0	9.76	1.054
Amber - -	0	10	20.79	0	9.54	1.030
Cow's milk -	0	10	20.79	0	9.54	1.030
Sea-water	0	10	20.79	0	9.54	1.030
Pump-water	0	10	13.30	0	9.26	1.000
Spring-water	0	10	12.94	0	9.25	0.999
Distilled water	0	10	11.42	0	9.20	0.993
Red wine -	0	10	11.42	0	9.20	0.993
Oil of amber	0	10	7.63	0	9.06	0.978
Proof spirits -	0	9	19.73	0	8.62	0.931
Dry oak - -	0	9	18.00	0	8.56	0.921
Oilive oil - -	0	9	15.17	0	8.45	0.913
Pure spirits -	0	9	3.27	0	8.02	0.866
Spirit of turpent.	0	9	2.76	0	7.99	0.864
Oil of turpentine	0	8	8.53	9	7.33	0.772
Dry crabtree	0	8	1.69	0	7.08	0.765
Sassafras wood	0	5	2.04	0	4.46	0.482
Cork - - -	0	2	12.77	0	2.21	0.248

15
to
out
quan-
of adul
ion in
als.

als

als

16
How to try
spirituous
liquors.

17
The velocity of
spouting
water.

Plate
CLII.
fig. 9.

18

Plate
CLII.
fig. 9.

possible from a pipe whose-mouth is at the centre of the femicircle; because a perpendicular to its diameter (supposed parallel to the side of the vessel) drawn from that point, is the longest that can possibly be drawn from any part of the diameter to the circumference of the femicircle. Thus, if the vessel AB be full of water, the horizontal pipe D be in the middle of its side, and the femicircle *Nedcb* be described upon D as a centre, with the radius or semidiameter DgN, or Dfb, the perpendicular Dd to the diameter ND is the longest that can be drawn from any part of the diameter to the circumference *Nedcb*. And if the vessel be kept full, the jet G will spout from the pipe D, to the horizontal distance NM, which is double the length of the perpendicular Dd. If two other pipes, as C and E, be fixed into the side of the vessel at equal distances above and below the pipe D, the perpendiculars Cc and Ee, from these pipes to the femicircle, will be equal; and the jets F and H spouting from them will each go to the horizontal distance NK; which is double the length of either of the equal perpendiculars Cc or Dd.

19
How water
may be
conveyed
over hills
and val-
leys.

Fluids by their pressure may be conveyed over hills and valleys in bended pipes, to any height not greater than the level of the springs from whence they flow. This is what the ancients were ignorant of; and therefore they usually built *AQUEDUCTS* (vast rows of arches one above another, between two hills, at a vast expence of money, time, and labour,) in order to convey water over them, cross the valley, in a common channel. This is now done to equal advantage, and at much less expence, by a range of pipes laid down one hill and up the other. An instance whereof may be given by a bent tube or crane; into one of the equal legs whereof if water be poured, it will rise to the same level exactly in the other. The reason is obvious: In the leg A, (fig. 14.) there are, suppose, two ounces of water endeavouring by the power of gravity to descend with the force of 2; these will thrust forward, buoy up, and support an equal quantity of a like fluid in B; and the bottom of the machine C, against which both sides equally bear, will of consequence sustain a double pressure, or that of four ounces; and in the present case will pretty well represent the prop or fixed point of a balance-beam; as the equal fluid-columns AC, and BC, may be admitted to denote equal weights, suspended on the balance-arms, counterpoising each other. So that the rise of fluids to their first level, thus considered, is a case truly statical; and all their other motions proceed only from weight added.

20
The sy-
phon.

A *syphon*, generally used for decanting liquors, is a bended pipe, whose legs are of unequal lengths; and the shortest leg must always be put into the liquor intended to be decanted, that the perpendicular altitude of the column of liquor in the other leg may be longer than the column in the immersed leg, especially above the surface of the water. For, if both columns were equally high in that respect, the atmosphere, which presses as much upward as downward, and therefore acts as much upward against the column in the leg that hangs without the vessel, as it act downward upon the surface of the liquor in the vessel, would hinder the running of the liquor through the syphon, even though it were brought over the bended

part by suction. So that there is nothing left to cause the motion of the liquor, but the superior weight of the column, in the longer leg, on account of its having the greater perpendicular height.

Let D be a cup filled with water to C; and ABC Fig. 1 a syphon, whose shorter leg BCF is immersed in the water from C to F. If the end of the other leg were no lower than the line AC, which is level with the surface of the water, the syphon would not run, even though the air should be drawn out of it at the mouth A. For although the suction would draw some water at first, yet the water would stop at the moment the suction ceased; because the air would act as much upward against the water at A, as it acted downward for it by pressing on the surface at C. But if the leg AB comes down to G, and the air be drawn out at G by suction, the water will immediately follow, and continue to run until the surface of the water in the cup comes down to F; because, till then, the perpendicular height of the column BAG will be greater than that of the column CB; and, consequently, its weight will be greater, until the surface comes down to F; and then the syphon will stop, though the leg CF should reach to the bottom of the cup. For which reason, the leg that hangs without the cup is always made long enough to reach below the level of its bottom; as from d to E: and then, when the syphon is emptied of air by suction at E, the water immediately follows, and by its continuity brings away the whole from the cup; just as pulling one end of a thread will make the whole clue follow.

If the perpendicular height of a syphon, from the surface of the water to its bended top at B, be more than 33 feet, it will draw no water, even though the other leg were much longer, and the syphon quite emptied of air, because the weight of a column of water 33 feet high, is equal to the weight of as thick a column of air, reaching from the surface of the earth to the top of the atmosphere: so that there will then be an equilibrium; and consequently, though there would be weight enough of air upon the surface C to make the water ascend in the leg CB almost to the height B, if the syphon were emptied of air, yet the weight would not be sufficient to force the water over the bend; and therefore, it could never be brought into the leg BAG.

Mercury may be drawn through a syphon in the same manner as water; but then the utmost height of the syphon must always be less than 30 inches, as mercury is near 14 times heavier than water. That fluids are forced through the syphon by the pressure of the atmosphere, is proved experimentally by the air-pump; for, if a syphon immersed in a vessel of water be placed when running in the receiver, and the air extracted, the running will immediately cease. If the syphon is very small, however, this is not always the case; and the running of capillary syphons *in vacuo* is a circumstance very difficult to be explained. See *BAROMETER*, n° 10—13. and *SYPHON*.

There is a sort of syphon that will draw off water without having the air previously extracted from it: this consists of a capillary tube, about 1-10th of an inch bore, and acts by the attraction of cohesion: for the water being attracted by the leg immersed, is slowly

Hydraulics. slowly drawn up to the top of the syphon, and from thence gradually descends by its own gravity. From the same cause it is, that if one end of a piece of the lift of cloth be put into the water of a vessel, and the other end hang over its side, the water will be sucked up by the end of the lift in the vessel, which in this case acts as a bundle of very fine capillary tubes, and drop from the other end. This experiment with a capillary tube will succeed *in vacuo*.

Upon the principle of the syphon depend the experiments of *Tantalus's cup*, n° 38; the *Fountain at command*, n° 39; and the *inverted drinking glass*, n° 52. As to the last of these, it may be here observed, that if the paper was put dry on such a vessel empty, it would sink in the air, and fall away even by its own gravity; and if put on wet, it were to be doubted whether a very small weight added thereto would not separate it from the glass, so inconsiderable would the tenacity of the water be in this case. The paper therefore cannot be supposed to support the incumbent weight of water; and the true cause thereof must be this: The bottom and sides of the inverted glass-vessel being rigid, keep off the pressure of the air from the fluid above, whereas it hath liberty of access and freely acts thereon below: and that it does so, will in part appear to an observer by the concavity of the paper underneath. Could the air's pressure in this case be any-how admitted through the foot of the vessel inverted, without doubt the whole column would descend together. And the like would happen should the paper be removed; but for a different reason, viz. the large column of water in the mug, being composed of many collateral ones, which, being disposed as in a bundle, rest on the paper wherewith the vessel is covered, as on a common base; and these being all equally dense, and equally fluid, are all retained, and continued of the same length, by the general and uniform pressure of the air against the paper below; and so long as this continues, none of them getting the least advantage over the rest, they are all sustained in a body compact together. But when the paper is removed, it being scarce possible to hold the vessel so exactly level, but that some one or other of these smaller fluid columns will become longer, consequently heavier, than those adjacent, and, over-balancing the rest, will descend, and give the lighter fluid, the air, leave to rise into its place, even to the top of the glass; the general pressure whereof being there admitted, will soon cause the rest of them to move, and the whole quantity will then descend, seemingly together.

Again, should a vessel be but part filled with water, the same effect will follow to a certain degree. For instance, suppose we fill a long glass half with water, cover it with paper, and turn it down as before. Six inches suppose of water, endeavouring to descend, will by its weight rarely the air in the glass above it, perhaps a 60th part or more. The denser air without will then overpoise the air rarefied within; and therefore a certain quantity of water, equal to the difference of the two pressures, will in this case be thereby buoyed up and supported. But the air within the glass being dilated as aforesaid, the water suspended must be expected to hang something below the mouth of it; though not enough, perhaps, to over-

Vol. V.

come the tenacity of the water, and make it all descend.

Upon the principle of the syphon also we may easily account for *intermitting or reciprocating springs*. Let AA be part of a hill, within which there is a cavity BB; and from this cavity a vein or channel running in the direction of BCDE. The rain that falls upon the side of the hill will sink and strain through the small pores and crannies G, G, G, G; and fill the cavity K with water. When the water rises to the level HHC, the vein BCDE will be filled to C, and the water will run through CDF as through a syphon; which running will continue until the cavity be emptied, and then it will stop until the cavity be filled again.

We have seen that fluids led in pipes, will always rise to the level of the reservoir whence they are supplied; the rising column being pushed forward, and raised by another equally heavy, at the same time endeavouring to descend. A like effect might be expected from jets of water thus impelled, did not friction against the sides of the machines, and the resistance of the air, both lateral and perpendicular, generally prove an abatement, and prevent its rising so high as the head.

Where jets are executed in the best manner, and the friction spoken of is as much as possible removed, the impediment of the air only, through which they needs must beat in their rise, will cause them, according to experiment, to fall short of the height of the reservoirs, in the following proportions, viz.

JET.	RESERVOIR.
Feet.	Feet. Inches.
5	5 : 1
10	10 : 4
15	15 : 9
20	21 : 4
25	27 : 1
30	33 : 0
35	39 : 1
40	45 : 4
45	51 : 9
50	58 : 4
55	65 : 1
60	72 : 0
65	79 : 1
70	86 : 4
75	93 : 9
80	101 : 4
85	109 : 1
90	117 : 0
95	125 : 1
100	133 : 4

Whence in general it may be observed:

That as often as a five-foot jet (to be taken in these matters as a standard,)

Shall be contained in the height of any jet proposed;

By so many inches multiplied into themselves, or squared,

The surface of the water in the reservoir which supplies it, ought to exceed that jet in height.

Thus, to obtain a jet of 30 feet, which contains five

Hydraulics. feet six times, the reservoir ought to be 36 inches, or a yard higher; and a jet of 60 feet may be had from a head higher by four times that difference, 144 inches, or four yards. So that jets done in the best manner fall short of the heights of their reservoirs, in a kind of subduplicate ratio of the heights to which they rise.

This great disproportion in the rise of jets must in general be owing to the resistance of the air they are made to move through; which has been shewn to be in proportion to the squares of their celerities respectively: nor can the acceleration of the falling water in the pipe, or the retardation of the rising stream by the action of gravity, be concerned at all in it; since these are probably adequate, and counterbalance each other every where in the same level.

The air's resistance being thus considerable, it will always be found necessary to increase the bore of the adjutage or spouting-pipe with the height of the reservoir: for if it be too small, the rising stream will want sufficient weight and power to divide the air; which being denser near the earth, a small stream of water, endeavouring to mount to a great height, will be dashed against it with so great violence, as to fall away in a mist and be wholly lost. And it may be observed, that the weightier any body is, the greater force it will have when in motion: since an ounce-ball fired from a musquet, will go much farther, and do greater execution, than will an equal weight of shot; and these again may be projected farther than so much lead rased into powder and fired off. A charge of water fired from a pistol would scarce wet a paper at the distance of six feet. Accordingly, should a cask of water be any where pierced with holes of two, four, six, eight, and twelve lines over, all in the same level, the larger bore will always be found to throw the water farthest.

It may be of use here to add Mr Marriote's proportions of the bores of the adjutages and pipes of conduct, who was very conversant in these things, and hath written very well on this subject.

N. B. The French divide their inch into 12 equal parts, which they call lines.

Heights of Reservoirs.	Diameters of fit Adjutages.	Diameter of the Pipes of Conduct.
FEET.	LINES.	LINES.
5	3, 4, 5, or 6	22
10	4, 5, or 6	25 INCHES.
15	5, or 6	27, or $2\frac{1}{2}$
20	6, or half an inch	30, or $2\frac{1}{2}$
25	Ditto	33, or $2\frac{1}{2}$
30	Ditto	36, or 3
40	7, or 8	51, or $4\frac{1}{4}$
50	8, or 10	65, or $5\frac{1}{2}$
60	10, or 12	72, or 6
80	12, or 14	84, or 7
100	12, 14, or 15	96, or 8

Hence it may be remarked, that there is a certain fit proportion to be observed between the adjutage whereby the jet is delivered, and the pipe conducting it from the head. In general, About five times the diameter of the adjutage for jets under half an inch, and six or seven times for all above, will size the pipes of conduct pretty well: not but it will always be an error on the right side, to have them rather larger than in strict-

ness they ought to be, that the jet may always be freely supplied with water, and in due time.

For a like reason, if there be occasion for a cock to be placed in any part of the pipe of conduct, particular care must be taken that it should be there bigger in proportion, that the water-way may not be pinched; but that the cavity be left at least equal to the bore of the rest of the pipe.

The bore of an adjutage cannot be too smooth or true. Those that are cylindrical are best; those that are bored conical work, because of the reflections of the water from the inclined sides of the machine, which in the hurry of the issuing stream will in them unavoidably be made.

When fluids are designed to be raised higher than the springs from whence they flow, forcing engines must be used; of which, and other hydraulic machines, we come now to give a particular account.

SECT. V. Hydraulic Engines.

The pump is at once the most common and most useful of all the hydraulic instruments. It was first invented by Ctesibius, a mathematician of Alexandria, 120 B. C. When the air's pressure came afterwards to be known, it was much improved, and it is now brought to a great degree of perfection.

Of this machine there are simply three kinds, viz. the sucking, the forcing, and the lifting-pump. By the two last, water may be raised to any height, with an adequate apparatus and sufficient power: by the former it may, by the general pressure of the atmosphere on the surface of the well-water, be raised no more than 33 feet, as was before hinted, though in practice it is seldom applied to the raising it much above 28; because from the variations observed on the barometer, it is apprehended that the air may, on certain occasions, be something lighter than 33 feet of water; and whenever that shall happen, for want of the due counterpoise, this pump may fail in its performance.

The common sucking-pump, with which we draw water out of wells, is an engine both pneumatic and hydraulic. It consists of a pipe open at both ends, in which is a moveable piston, bucket, or sucker, as big as the bore of the pipe in that part wherein it works; and is leathern round, so as to fit the bore exactly; and may be moved up and down, without suffering any air to come between it and the pipe or pump-barrel.

We shall explain the construction of this and the forcing-pump by pictures of glass models, in which both the action of the pistons and motion of the valves are seen.

Hold the model DCBL upright in the vessel of wa-
ter K, the water being deep enough to rise at least as high as from A to I. The valve *a* on the moveable bucket G, and the valve *b* on the fixed box H, (which box quite fills the bore of the pipe or barrel at H) will each lie close, by its own weight, upon the hole in the bucket and box, until the engine begins to work. The valves are made of brass, and covered underneath with leather for closing the holes the more exactly: and the bucket G is raised and depressed alternately by the handle E and rod D, the bucket being supported at B before the working begins.

Take hold of the handle E, and thereby draw up the

23
Of pumps

24
The common pump

Plate
CLIII.
fig. 3.

the bucket from B to C, which will make room for the air in the pump all the way below the bucket to dilate itself, by which its spring is weakened, and then its force is not equivalent to the weight or pressure of the outward air upon the water in the vessel K: and therefore, at the first stroke, the outward air will press up the water through the notched foot A, into the lower pipe, about as far as *e*: this will condense the rarefied air in the pipe between *e* and C to the same state it was in before; and then, as its spring within the pipe is equal to the force or pressure of the outward air, the water will rise no higher by the first stroke; and the valve *b*, which was raised a little by the dilation of the air in the pipe, will fall, and stop the hole in the box H; and the surface of the water will stand at *e*. Then depress the piston or bucket from C to B; and as the air in the part B cannot get back again through the valve *b*, it will (as the bucket descends) raise the valve *a*, and so make its way through the upper part of the barrel *d* into the open air. But upon raising the bucket G a second time, the air between it and the water in the lower pipe at *a* will be again left at liberty to fill a larger space; and so its spring being again weakened, the pressure of the outward air on the water in the vessel K will force more water up into the lower pipe from *e* to *f*; and when the bucket is at its greatest height C, the lower valve *b* will fall, and stop the hole in the box H as before. At the next stroke of the bucket or piston, the water will rise through the box H towards B; and then the valve *b*, which was raised by it, will fall when the bucket G is at its greatest height. Upon depressing the bucket again, the water cannot be pushed back through the valve *b*, which keeps close upon the hole whilst the piston descends. And upon raising the piston again, the outward pressure of the air will force the water up through H, where it will raise the valve, and follow the bucket to C. Upon the next depression of the bucket G, it will go down into the water in the barrel B; and as the water cannot be driven back through the now close valve *b*, it will raise the valve *a* as the bucket descends, and will be lifted up by the bucket when it is next raised. And now, the whole space below the bucket being full, the water above it cannot sink when it is next depressed; but upon its depression, the valve *a* will rise to let the bucket go down; and when it is quite down, the valve *a* will fall by its weight, and stop the hole in the bucket. When the bucket is next raised, all the water above it will be lifted up, and begin to run off by the pipe F. And thus, by raising and depressing the bucket alternately, there is still more water raised by it; which getting above the pipe F, into the wide top I, will supply the pipe, and make it run with a continued stream.

So, at every time the bucket is raised, the valve *b* rises, and the valve *a* falls; and at every time the bucket is depressed, the valve *b* falls, and *a* rises.

As it is the pressure of the air or atmosphere which causes the water to rise and follow the piston or bucket G as it is drawn up; and since a column of water 33 feet high is of equal weight with as thick a column of the atmosphere from the earth to the very top of the air; therefore, the perpendicular height of the piston or bucket from the surface of the water in the well

must always be less than 33 feet; otherwise the water will never get above the bucket. But, when the height is less, the pressure of the atmosphere will be greater than the weight of the water in the pump, and will therefore raise it above the bucket: and when the water has once got above the bucket, it may be lifted thereby to any height, if the rod D be made long enough, and a sufficient degree of strength be employed to raise it with the weight of the water above the bucket.

The force required to work a pump, will be as the height to which the water is raised, and as the square of the diameter of the pump-bore in that part where the piston works. So that, if two pumps be of equal heights, and one of them be twice as wide in the bore as the other, the widest will raise four times as much water as the narrowest; and will therefore require four times as much strength to work it.

The wideness or narrowness of the pump, in any other part besides that in which the piston works, does not make the pump either more or less difficult to work, except what difference may arise from the friction of the water in the bore; which is always greater in a narrow bore than in a wide one, because of the greater velocity of the water.

The pump-rod is never raised directly by such a handle as E at the top, but by means of a lever, whose longer arm (at the end of which the power is applied) generally exceeds the length of the shorter arm five or six times; and, by that means, it gives five or six times as much advantage to the power. Upon these principles, it will be easy to find the dimensions of a pump that shall work with a given force, and draw water from any given depth. But, as these calculations have been generally neglected by pump-makers (either for want of skill or industry) the following table was calculated by the late ingenious Mr Booth for their benefit. In this calculation, he supposed the handle of the pump to be a lever increasing the power five times; and had often found that a man can work a pump four inches diameter and 30 feet high, and discharge 27½ gallons of water (English wine-measure) in a minute. Now, if it be required to find the diameter of a pump that shall raise water with the same ease from any other height above the surface of the well; look for that height in the first column, and over-against it in the second you have the diameter or width of the pump, and in the third you find the quantity of water which a man of ordinary strength can discharge in a minute.

Height of the pump above the surface of the well.	Diameter of the bore where the bucket works.	Water discharged in a minute, English wine-measure.	
Feet.	Inches.	Gallons.	Pints.
10	6 .93	81	6
15	5 .66	54	4
20	4 .90	40	7
25	4 .38	32	6
30	4 .00	27	2
35	3 .70	23	3
40	3 .46	20	3
45	3 .27	18	1
50	3 .10	16	3
55	2 .95	14	7
60	2 .84	13	5
65	2 .72	12	4
70	2 .62	11	5
75	2 .53	10	7
80	2 .45	10	2
85	2 .38	9	5
90	2 .31	9	1
95	2 .25	8	5
100	2 .19	8	1

25
The forcing
pump,
Plate
CLIII.
fig. 4.

The *forcing-pump* raises water through the box H in the same manner as the sucking-pump does, when the plunger or piston *g* is lifted up by the rod *D d*. But this plunger has no hole thro' it, to let the water in the barrel BC get above it, when it is depressed to B, and the valve *b* (which rose by the ascent of the water through the box H when the plunger *g* was drawn up) falls down and stops the hole in H, the moment that the plunger is raised to its greatest height. Therefore, as the water between the plunger *g* and box H can neither get through the plunger upon its descent, nor back again into the lower part of the pump *L e*, but has a free passage by the cavity around H into the pipe MM, which opens into the air-vessel KK at P; the water is forced through the pipe MM by the descent of the plunger, and driven into the air-vessel; and in running up through the pipe at P, it opens the valve *a*; which shuts at the moment the plunger begins to be raised, because the action of the water against the under side of the valve then ceases.

The water, being thus forced into the air-vessel KK by repeated strokes of the plunger, gets above the lower end of the pipe GHI, and then begins to condense the air in the vessel KK. For, as the pipe GH is fixed air-tight into the vessel below F, and the air has no way to get out of the vessel but through the mouth of the pipe at I, and cannot get out when the mouth I is covered with water, and is more and more condensed as the water rises upon the pipe, the air then begins to act forcibly by its spring against the surface of the water at H: and this action drives the water up through the pipe IHGF, from whence it spouts in a jet S to a great height; and is supplied by alternately raising and depressing of the plunger *g*,

which constantly forces the water that it raises thro' the valve H, along the pipe MM, into the air-vessel KK.

The higher that the surface of the water H is raised in the air-vessel, the less space will the air be condensed into which before filled that vessel; and therefore the force of its spring will be so much the stronger upon the water, and will drive it with the greater force through the pipe at F: and as the spring of the air continues whilst the plunger *g* is rising, the stream or jet S will be uniform, as long as the action of the plunger continues; and when the valve *b* opens, to let the water follow the plunger upward, the valve *a* shuts, to hinder the water, which is forced into the air-vessel, from running back by the pipe MM into the barrel of the pump.

If there was no air-vessel to this engine, the pipe GHI would be joined to the pipe MMN at P; and then, the jet S would stop every time the plunger is raised, and run only when the plunger is depressed.

Of *lifting-pumps* there are several sorts; the most common is thus constructed. AB is the barrel, fixed in the frame KILM; which is also fixed immovable, with the lower part in the water that is to be pumped up. GEOHO is a frame with two strong iron rods, moveable through holes in the upper and lower parts of the pump, IK and LM. In the bottom of this frame is fixed an inverted piston BD, with its bucket and valve uppermost at D. From the top of the barrel there goes off a part KH, either fixed to the barrel, or moveable by a ball and socket (as here represented at F); but in either case so very exact and tight, that no water or air can possibly get into the barrel, as that would prevent the effect of the pump. In this part, at C, is fixed a valve opening upward.

When the piston frame is thrust down into the water, the piston D will descend, and the water beneath it rush up through the valve at D, and get above the piston; where, upon the frame's being lifted up, the piston will force the water through the valve C, into the cistern P, there to run off by the spout. It is to be remembered, that this sort of pump must be set so far in the water, that the piston may play below its surface. It appears by the above description, that this is only a different manner of constructing a forcing-pump.

By means of forcing-pumps, water may be raised to any height above the level of a river or spring; and machines may be contrived to work these pumps, either by a running stream, a fall of water, or by horses. An instance in each fort will be sufficient to shew the method.

1. By a running stream, or a fall of water. Let AA be a wheel, turned by the fall of water BB; and have any number of cranks (suppose six) as C, D, E, F, G, H, on its axis, according to the strength of the fall of water, and the height to which the water is intended to be raised by the engine. As the wheel turns round, these cranks move the levers *c, d, e, f, g, h*, up and down, by the iron rods *i, k, l, m, n, o*; which alternately raise and depress the pistons by the other iron pipes *p, q, r, s, t, u, v, w, x, y*, in 12 pumps; nine whereof, as L, M, N, O, P, Q, R, S, T, appear in the plate; the other three being hid behind the work at V. And as pipes may go from all these pumps, to convey

26
The lifting
pump,
Plate
CLII.
fig. 13.

Plate
CLIII.
fig. 5.

27
A pump-
engine to
go by wa-
ter.

Fig. 1.

Fig. 13.

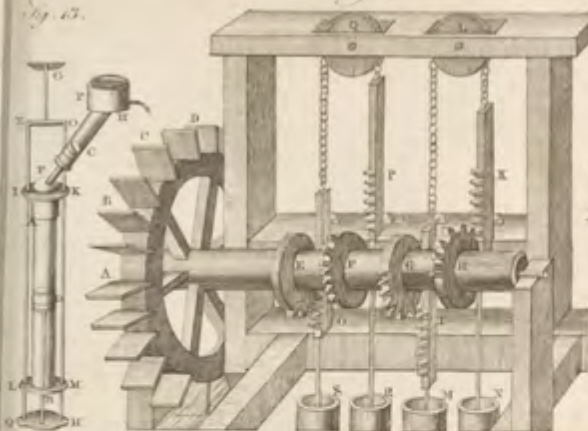


Fig. 2.

Fig. 14.

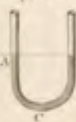


Fig. 3.

Fig. 4.

Fig. 15.

Fig. 6.

Fig. 8.

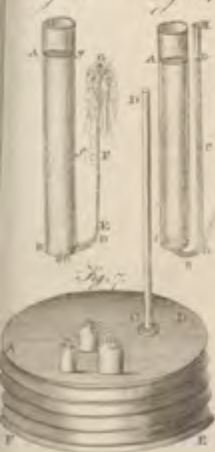


Fig. 12.

Fig. 10.

Fig. 11.

Fig. 9.



Hydraulic
Engines.

Hydraulic
Engines.

vey the water (drawn up by them to a small height) into a close cistern, from which the main pipe proceeds, the water will be forced into this cistern by the descent of the pistons. And as each pipe, going from its respective pump into the cistern, has a valve at its end in the cistern, these valves will hinder the return of the water by the pipes; and therefore, when the cistern is once full, each piston upon its descent will force the water (conveyed into the cistern by a former stroke) up the main pipe, to the height the engine was intended to raise it: which height depends upon the quantity raised, and the power that turns the wheel. When the power upon the wheel is lessened by any defect of the quantity of water turning it, a proportionable number of the pumps may be laid aside, by disengaging their rods from the vibrating levers.

This figure is a representation of the engine erected at Blenheim for the duke of Marlborough, by the late ingenious Mr Aldersea. The water-wheel is $7\frac{1}{2}$ feet in diameter, according to Mr Switzer's account in his Hydraulics.

When such a machine is placed in a stream that runs upon a small declivity, the motion of the levers and action of the pumps will be but slow; since the wheel must go once round for each stroke of the pumps. But, when there is a large body of flow running water, a cog or spur wheel may be placed upon each side of the water-wheel AA, upon its axis, to turn a trundle upon each side; the cranks being upon the axis of the trundle. And by proportioning the cog-wheels to the trundles, the motion of the pumps may be made quicker, according to the quantity and strength of the water upon the first wheel; which may be as great as the workman pleases, according to the length and breadth of the float-boards or wings of the wheel. In this manner, the engine for raising water at London-Bridge is constructed in which the water-wheel is 20 feet diameter, and the floats 14 feet long.

ABCD is a wheel turned by water according to the order of the letters. On the horizontal axis are four small wheels, toothed almost half round; and the parts of their edges on which there are no teeth are cut down so as to be even with the bottoms of the teeth where they stand.

The teeth of these four wheels take alternately into the teeth of four racks, which hang by two chains over the pulleys Q and L; and to the lower ends of these racks there are four iron rods fixed, which go down into the four forcing-pumps, S, R, M, and N. And, as the wheels turn, the racks and pump-rods are alternately moved up and down.

Thus suppose the wheel G has pulled down the rack I, and drawn up the rack K by the chain: as the last tooth of G just leaves the uppermost tooth of I, the first tooth of H is ready to take into the lowermost tooth of the rack K, and pull it down as far as the teeth go; and then the rack I is pulled upward thro' the whole space of its teeth, and the wheel G is ready to take hold of it, and pull it down again, and so draw up the other.—In the same manner, the wheels E and F work the racks O and P.

These four wheels are fixed on the axle of the great wheel in such a manner, with respect to the positions of their teeth, that, whilst they continue turning round,

there is never one instant of time in which one or other of the pump-rods is not going down and forcing the water. So that, in this engine, there is no occasion for having a general air-vessel to all the pumps, to procure a constant stream of water flowing from the upper end of the main pipe.

From each of these pumps, near the lowest end, in the water, there goes off a pipe, with a valve on its farthest end from the pump; and these ends of the pipes all enter one close box, into which they deliver the water: and into this box, the lower end of the main conduct-pipe is fixed. So that, as the water is forced or pushed into the box, it is also pushed up the main pipe to the height that it is intended to be raised.

2. Where a stream or fall of water cannot be had, and gentlemen want to have water raised, and brought to their houses from a rivulet or spring; this may be effected by a horse-engine, working three forcing-pumps which stand in a reservoir filled by the spring or rivulet: the pistons being moved up and down in the pumps by means of a triple crank ABC, which, as it is turned round by the trundle G, raises and depresses the rods D, E, F. If the wheel has three times as many cogs as the trundle has staves or rounds, the trundle and cranks will make three revolutions for every one of the wheel: and as each crank will fetch a stroke in the time it goes round, the three cranks will make nine strokes for every turn of the great wheel.

The cranks should be made of cast iron, because that will not bend; and they should each make an angle of 120 with both of the others, as at *a, b, c*; which is (as it were) a view of their *radii* in looking endwise at the axis: and then there will be always one or other of them going downward, which will push the water forward with a continued stream into the main pipe. For, when *b* is almost at its lowest situation, and is therefore just beginning to lose its action upon the piston which it moves, *c* is beginning to move downward, which will by its piston continue the propelling force upon the water: and when *c* is come down to the position of *b*, *a* will be in the position of *c*.

The more perpendicularly the piston-rods move up and down in the pumps, the freer and better will their strokes be: but a little deviation from the perpendicular will not be material. Therefore, when the pumps D, E, and F, go down into a deep well, they may be moved directly by the cranks, as is done in a very good horse-engine of this sort at the late Sir James Creed's at Greenwich, which forces up water about 64 feet from a well under ground, to a reservoir on the top of his house. But when the cranks are only at a small height above the pumps, the pistons must be moved by vibrating levers, as in the above engine at Blenheim: and the longer the levers are, the nearer will the strokes be to a perpendicular.

Let us suppose, that in such an engine as Sir James Creed's, the great wheel is 12 feet diameter, the quantity of the trundle 4 feet, and the radius or length of each crank quantity of 9 inches, working a piston in its pump. Let there be three pumps in all, and the bore of each pump be four inches diameter. Then, if the great wheel has three horse-times as many cogs as the trundle has staves, the trun-

(2d) 18
A pump-
engine to
go by
horses.

Plate
CLIII.
fig. 6.

29

die

dle and cranks will go three times round for each revolution of the horses and wheel, and the three cranks will make nine strokes of the pumps in that time, each stroke being 18 inches (or double the length of the crank) in a four-inch bore. Let the diameter of the horse-walk be 18 feet, and the perpendicular height to which the water is raised above the surface of the well be 64 feet.

If the horses go at the rate of two miles an hour (which is very moderate walking) they will turn the great wheel 187 times round in an hour.

In each turn of the wheel the pistons make nine strokes in the pumps, which amount to 1683 in an hour.

Each stroke raises a column of water 18 inches long and four inches thick, in the pump barrels; which column, upon the descent of the piston, is forced into the main pipe, whose perpendicular altitude above the surface of the well is 64 feet.

Now, since a column of water 18 inches long, and 4 inches thick, contains 226.18 cubic inches, this number multiplied by 1683 (the strokes in an hour) gives 380661 for the number of cubic inches of water raised in an hour.

A gallon, in wine-measure, contains 231 cubic inches, by which divide 380661, and it quotes 1468 in round numbers, for the number of gallons raised in an hour; which, divided by 63, gives 26 $\frac{2}{3}$ hogheads. If the horses go faster, the quantity raised will be so much the greater.

In this calculation it is supposed that no water is wasted by the engine. But as no forcing engine can be supposed to lose less than a fifth part of the calculated quantity of water, between the pistons and barrels, and by the opening and shutting of the valves, the horses ought to walk almost 2 $\frac{1}{2}$ miles *per* hour to fetch up this loss.

A column of water 4 inches thick and 64 feet high, weighs 349 $\frac{1}{2}$ pounds avoirdupois, or 424 $\frac{1}{2}$ pounds troy; and this weight, together with the friction of the engine, is the resistance that must be overcome by the strength of the horses.

The horse-tackle should be so contrived, that the horses may rather push on than drag the levers after them. For, if they draw, in going round the walk, the outside leather-straps will rub against their sides and hams; which will hinder them from drawing at right angles to the levers, and so make them pull at a disadvantage. But if they push the levers before their breasts, instead of dragging them, they can always walk at right angles to these levers.

It is noways material what the diameter of the main or conduct pipe be: for the whole resistance of the water therein against the horses will be according to the height to which it is raised, and the diameter of that part of the pump in which the piston works, as we have already observed. So that by the same pump, an equal quantity of water may be raised in (and consequently made to run from) a pipe of a foot diameter, with the same ease as in a pipe of five or six inches: or rather with more ease, because its velocity in a large pipe will be less than in a small one, and therefore its friction against the sides of the pipe will be less also.

And the force required to raise water depends not

upon the length of the pipe, but upon the perpendicular height to which it is raised therein above the level of the spring. So that the same force, which would raise water to the height AB in the upright pipe AiklmnopgB, will raise it to the same height BHI in the oblique pipe AEEFGH. For the pressure of the water at the end A of the latter, is no more than its pressure against the end A of the former.

The weight or pressure of water at the lower end of the pipe, is always as the sine of the angle to which the pipe is elevated above the level parallel to the horizon. For, although the water in the upright pipe AB would require a force applied immediately to the lower end A equal to the weight of all the water in it, to support the water, and a little more to drive it up and out of the pipe; yet, if that pipe be inclined from its upright position to an angle of 80 degrees (as in A 80) the force required to support or to raise the same cylinder of water will then be as much less, as the sine 80 *b* is less than the radius AB; or as the sine of 80 degrees is less than the sine of 90. And so, decreasing as the sine of the angle of elevation lessens, until it arrives at its level AC or place of rest, where the force of the water is nothing at either end of the pipe. For, altho' the absolute weight of the water is the same in all positions, yet its pressure at the lower end decreases, as the sine of the angle of elevation decreases; as will appear plainly by a farther consideration of the figure.

Let two pipes, AB and AC, of equal lengths and bores, join each other at A; and let the pipe AB be divided into 100 equal parts, as the scale S is; whose length is equal to the length of the pipe.—Upon this length, as a radius, describe the quadrant BDC, and divide it into 90 equal parts or degrees.

Let the pipe AC be elevated to 10 degrees upon the quadrant, and filled with water: then, part of the water that is in it will rise in the pipe AB; and if it be kept full of water, it will raise the water in the pipe AB from A to *i*; that is, to a level *i* 10' with the mouth of the pipe at 10: and the upright line *a* 10, equal to A *c*, will be the sine of 10 degrees elevation; which being measured upon the scale S, will be about 17.4 of such parts as the pipe contains 100 in length: and therefore, the force or pressure of the water at A, in the pipe A 10, will be to the force or pressure at A in the pipe AB, as 17.3 to 100.

Let the same pipe be elevated to 20 degrees in the quadrant; and if it be kept full of water, part of that water will run into the pipe AB, and rise therein to the height A *k*, which is equal to the length of the upright line *b* 20, or to the sine of 20 degrees elevation; which, being measured upon the scale S, will be 34.2 of such parts as the pipe contains 100 in length. And therefore, the pressure of the water at A, in the full pipe A 20, will be to its pressure, if that pipe were raised to the perpendicular situation AB, as 34.2 to 100.

Elevate the pipe to the position A 30 on the quadrant, and if it be supplied with water, the water will rise from it, into the pipe AB, to the height A *l*, or to the same level with the mouth of the pipe at 30. The sine of this elevation, or of the angle of 30 degrees, is *c* 30; which is just equal to half the length

of the pipe, or to 50 of such parts of the scale as the length of the pipe contains 100. Therefore, the pressure of the water at A, in a pipe elevated 30 degrees above the horizontal level, will be equal to one half of what it would be if the same pipe stood upright in the situation AB.

And thus, by elevating the pipe to 40, 50, 60, 70, and 80 degrees on the quadrant, the sines of these elevations will be $d\ 40$, $e\ 50$, $f\ 60$, $g\ 70$, and $h\ 80$; which will be equal to the heights Am , Ar , As , At , and Av : and these heights measured upon the scale S will be 64.3, 76.6, 86.6, 94.0, and 98.5; which express the pressures at A in all these elevations, considering the pressure in the upright pipe AB as 100.

Sine of	Parts	Sine of	Parts	Sine of	Parts
D. 1	17	D. 31	515	D. 61	875
2	35	32	530	62	883
3	52	33	545	63	891
4	70	34	559	64	899
5	87	35	573	65	906
6	104	36	588	66	913
7	122	37	602	67	920
8	139	38	616	68	927
9	156	39	629	69	934
10	174	40	643	70	940
11	191	41	656	71	945
12	208	42	669	72	951
13	225	43	682	73	956
14	242	44	695	74	961
15	259	45	707	75	966
16	276	46	719	76	970
17	292	47	731	77	974
18	309	48	743	78	978
19	325	49	755	79	982
20	342	50	766	80	985
21	358	51	777	81	988
22	375	52	788	82	990
23	391	53	799	83	992
24	407	54	809	84	994
25	423	55	819	85	996
26	438	56	829	86	997
27	454	57	839	87	998
28	469	58	848	88	999
29	485	59	857	89	1000
30	500	60	866	90	1000

Because it may be of use to have the lengths of all the sines of a quadrant from 0 degrees to 90, we have given the foregoing Table, shewing the length of the sine of every degree in such parts as the whole pipe (equal to the radius of the quadrant) contains 1000. Then the sines will be integral or whole parts in length. But if you suppose the length of the pipe to be divided only into 100 equal parts, the last figure of each part or sine must be cut off as a decimal; and then those which remain at the left hand of this separation will be integral or whole parts.

Thus, if the radius of the quadrant (supposed to be equal to the length of the pipe AC) be divided into 1000 equal parts, and the elevation be 45 degrees, the sine of that elevation will be equal to 707 of these parts: but if the radius be divided only into

100 equal parts, the same sine will be only 70.7 or 70 $\frac{7}{10}$ of these parts. For, as 1000 is to 707, so is 100 to 70.7.

As it is of great importance to all engine-makers, to know what quantity and weight of water will be contained in an upright round pipe of a given diameter and height; so as, by knowing what weight is to be raised, they may proportion their engines to the force which they can afford to work them; we shall subjoin Tables shewing the number of cubic inches of water contained in an upright pipe of a round bore, of any diameter from one inch to six and a half, and of any height from one foot to two hundred: together with the weight of the said number of cubic inches, both in troy and avoirdupois ounces. The number of cubic inches divided by 231, will reduce the water to gallons in wine-measure; and, divided by 282, will reduce it to the measure of ale-gallons. Also, the troy ounces divided by 12, will reduce the weight to troy pounds; and the avoirdupois ounces divided by 16, will reduce the weight to avoirdupois pounds.

And here we must repeat it again, that the weight or pressure of the water acting against the power that works the engine, must always be estimated according to the perpendicular height to which it is to be raised, without any regard to the length of the conduct-pipe, when it has an oblique position, and as if the diameter of that pipe were just equal to the diameter of that part of the pump in which the piston works. Thus, by the following Tables, the pressure of the water, against an engine whose pump is of a $4\frac{1}{2}$ inch bore, and the perpendicular height of the water in the conduct pipe is 80 feet, will be equal to 8057.5 troy ounces, and to 884.82 avoirdupois ounces; which makes 671.4 troy pounds, and 553 avoirdupois.

EXAMPLE. Required the number of cubic inches, and the weight of the water, in an upright pipe 278 feet high, and $1\frac{1}{2}$ inch diameter.

Feet.	Cubic inches.	Troy oz.	Avoir. oz.
200	4241.1	2238.2	2457.8
70	1484.4	783.3	860.2
8	169.6	89.5	98.3
Ans. 278	5895.1	3111.0	3416.3

Here the nearest single decimal figure is only taken into the account; and the whole being reduced by division, amounts to 25 $\frac{1}{2}$ wine-gallons in measure; to 259 $\frac{1}{2}$ pounds troy, and to 213 $\frac{1}{2}$ pounds avoirdupois.

These tables were at first calculated to six decimal places for the sake of exactness: but in transcribing them there are no more than two decimal figures taken into the account, and sometimes but one; because there is no necessity for computing to hundredth-parts of an inch or of an ounce in practice.

Inch diameter.			
Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoirdupois ounces.
1	9.42	4.97	5.46
2	18.85	9.95	10.92
3	28.27	14.92	16.38
4	37.70	19.89	21.85
5	47.12	24.87	27.31
6	56.55	29.84	32.77
7	65.97	34.82	38.23
8	75.40	39.79	43.69
9	84.82	44.76	49.16
10	94.25	49.74	54.62
20	188.49	99.48	109.24
30	282.74	149.21	163.86
40	376.99	198.95	218.47
50	471.24	248.69	273.09
60	565.49	298.43	327.71
70	659.73	348.17	382.33
80	753.98	397.90	436.95
90	848.23	447.64	491.57
100	942.48	497.38	546.19
200	1884.96	994.76	1092.38

2 Inches diameter.			
Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoirdupois ounces.
1	37.70	19.89	21.85
2	75.40	39.79	43.69
3	113.10	59.68	65.54
4	150.80	79.58	87.39
5	188.50	99.47	109.24
6	226.19	119.37	131.08
7	263.89	139.26	152.93
8	301.59	159.16	174.78
9	339.29	179.06	196.63
10	376.99	198.95	218.47
20	753.98	397.90	436.95
30	1130.97	596.85	655.42
40	1507.97	795.80	873.90
50	1884.96	994.75	1092.37
60	2261.95	1193.70	1310.85
70	2638.94	1392.65	1529.32
80	3015.93	1591.60	1747.80
90	3392.92	1790.55	1966.27
100	3769.91	1989.51	2184.75
200	7539.82	3979.00	4369.50

1½ Inch diameter.			
Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoirdupois ounces.
1	21.21	11.19	12.29
2	42.41	22.38	24.58
3	63.62	33.57	36.87
4	84.82	44.76	49.16
5	106.03	55.95	61.45
6	127.23	67.15	73.73
7	147.44	78.34	86.02
8	169.65	89.53	98.31
9	190.85	100.72	110.60
10	212.06	111.91	122.89
20	424.12	223.82	245.78
30	636.17	335.73	368.68
40	848.23	447.64	491.57
50	1060.29	559.55	614.46
60	1272.35	671.46	737.35
70	1484.40	783.37	860.24
80	1696.46	895.28	983.14
90	1908.52	1007.19	1106.03
100	2120.58	1119.09	1228.92
200	4241.17	2238.18	2457.84

1½ Inches diameter.			
Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoirdupois ounces.
1	58.90	31.08	34.14
2	117.81	62.17	68.27
3	176.71	93.26	102.41
4	235.62	124.34	136.55
5	294.52	155.43	170.68
6	353.43	186.52	204.82
7	412.33	217.60	238.96
8	471.24	248.69	273.09
9	530.14	279.77	307.23
10	589.05	310.86	341.37
20	1178.10	621.72	682.73
30	1767.15	932.58	1024.10
40	2356.20	1243.44	1365.47
50	2945.25	1554.30	1706.83
60	3534.29	1865.16	2048.20
70	4123.34	2176.02	2389.57
80	4712.39	2486.88	2730.94
90	5301.44	2797.74	3072.30
100	5890.49	3108.60	3413.67
200	11780.98	6217.20	6827.34

H Y D R O S T A T I C T A B L E S.

3 Inches diameter.			
Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoirdupois ounces.
1	84.8	44.76	49.16
2	169.6	89.53	98.31
3	254.5	134.29	147.47
4	239.3	179.06	196.63
5	424.1	223.82	245.78
6	508.9	268.58	294.94
7	593.7	313.35	344.10
8	698.6	358.11	393.25
9	763.4	402.87	442.41
10	848.2	447.64	491.57
20	1696.5	895.28	983.14
30	2244.7	1342.92	1474.70
40	3392.9	1790.56	1966.27
50	4241.1	2238.19	2457.84
60	5089.4	2685.83	2949.41
70	5937.6	3133.47	3440.98
80	6785.8	3581.11	3932.55
90	7634.1	4028.75	4424.12
100	8482.3	4476.39	4915.68
200	16964.6	8952.78	9831.36

4 inches diameter.			
Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoirdupois ounces.
1	150.8	79.6	87.4
2	301.6	159.2	174.8
3	452.4	238.7	262.2
4	603.2	318.3	349.6
5	754.0	397.9	436.9
6	904.8	477.5	524.3
7	1055.6	557.1	611.7
8	1206.4	636.6	699.1
9	1357.2	716.2	786.5
10	1508.0	795.8	873.9
20	3115.9	1591.6	1747.8
30	4523.9	2387.4	2621.7
40	6031.9	3183.2	3495.6
50	7539.8	3979.0	4369.5
60	9047.8	4774.8	5243.4
70	10555.8	5570.6	6117.3
80	12063.7	6366.4	6991.2
90	13571.7	7162.2	7865.1
100	15079.7	7958.0	8739.0
200	30159.3	15916.0	17478.0

3½ Inches diameter.			
Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoirdupois ounces.
1	115.4	60.9	66.9
2	230.9	121.8	133.8
3	346.4	182.8	200.7
4	461.8	243.7	267.6
5	577.3	304.6	334.5
6	692.7	365.6	401.4
7	808.2	426.5	468.4
8	923.6	487.4	535.3
9	1039.1	548.3	602.2
10	1154.5	609.3	669.1
20	2309.1	1218.6	1338.2
30	3463.6	1827.9	2007.2
40	4618.1	2437.1	2676.3
50	5772.7	3046.4	3345.4
60	6927.2	3655.7	4014.5
70	8081.7	4265.0	4683.6
80	9236.3	4874.3	5352.6
90	10390.8	5483.6	6021.7
100	11545.4	6092.9	6690.8
200	23090.7	12185.7	13381.5

4½ Inches diameter.			
Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoirdupois ounces.
1	190.8	100.7	110.6
2	381.7	201.4	221.2
3	572.6	302.2	331.8
4	763.4	402.9	442.4
5	954.3	503.6	453.0
6	1145.1	604.3	663.6
7	1337.9	705.0	774.2
8	1526.8	805.7	884.8
9	1717.7	906.5	995.4
10	1908.5	1007.2	1106.0
20	3817.0	2014.4	2212.1
30	5725.6	3021.6	3318.1
40	7634.1	4028.7	4424.1
50	9542.6	5035.9	5530.1
60	11451.1	6043.1	6636.2
70	13359.6	7050.3	7742.2
80	15268.2	8057.5	8848.2
90	17176.7	9064.7	9954.3
100	19085.2	10071.9	11060.3
200	38170.4	20143.8	22120.6

HYDROSTICAL TABLES.

5 Inches diameter.			
Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoirdupois ounces.
1	235.6	124.3	136.5
2	471.2	248.7	273.1
3	706.8	373.0	409.6
4	942.5	497.4	546.2
5	1178.1	621.7	682.7
6	1413.7	746.1	819.3
7	1649.3	870.4	955.8
8	1884.9	994.8	1092.4
9	2120.6	1119.1	1228.9
10	2356.2	1243.4	1365.5
20	4712.4	2486.9	2730.9
30	7068.6	3730.3	4096.4
40	9424.8	4973.8	5461.9
50	11780.0	6217.2	6827.3
60	14137.2	7460.6	8192.6
70	16493.4	8704.1	9558.3
80	18849.6	9947.5	10923.7
90	21205.8	11191.0	12289.2
100	23562.0	12434.4	13654.7
200	47124.0	24868.8	27309.3

6 Inches diameter.			
Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoirdupois ounces.
1	339.3	179.0	196.6
2	678.6	358.1	393.3
3	1017.9	537.2	589.9
4	1357.2	716.2	786.5
5	1696.5	895.3	983.1
6	2035.7	1074.3	1179.8
7	2375.0	1253.4	1376.4
8	2714.3	1432.4	1573.0
9	3053.6	1611.5	1769.6
10	3392.9	1790.6	1966.3
20	6785.8	3581.1	3932.5
30	10178.8	5371.7	5898.8
40	13571.7	7162.2	7865.1
50	16964.6	8952.8	9831.4
60	20357.5	10743.3	11797.6
70	23750.5	12533.9	13763.9
80	27143.4	14324.4	15730.2
90	30536.3	16115.0	17696.5
100	33929.2	17905.6	19662.7
200	67858.4	35811.2	39325.4

5½ Inches diameter.			
Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoirdupois ounces.
1	285.1	150.5	164.3
2	570.2	300.9	328.5
3	855.3	451.4	492.8
4	1140.4	601.8	657.1
5	1425.5	752.3	821.3
6	1710.6	902.7	985.6
7	1995.7	1053.2	1149.9
8	2280.8	1203.6	1314.2
9	2565.9	1354.1	1478.4
10	2851.0	1504.6	1642.7
20	5702.0	3009.1	3285.4
30	8553.0	4513.7	4928.1
40	11404.0	6018.2	6570.8
50	14255.0	7522.8	8213.5
60	17106.0	9027.4	9856.2
70	19957.0	10531.9	11498.9
80	22808.0	12036.5	13141.6
90	25659.0	13541.1	14784.3
100	28510.0	15045.6	16426.9
200	57020.0	30091.2	32853.8

6½ Inches diameter.			
Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoirdupois ounces.
1	398.2	210.1	230.7
2	797.4	420.3	461.4
3	1195.6	630.4	692.1
4	1593.8	840.6	922.8
5	1991.9	1050.8	1153.6
6	2390.1	1260.9	1384.3
7	2788.3	1471.1	1615.0
8	3186.5	1681.2	1845.7
9	3584.7	1891.3	2076.4
10	3982.9	2101.5	2307.1
20	7965.8	4202.9	4614.3
30	11948.8	6304.4	6921.4
40	15931.7	8405.9	9228.6
50	19914.6	10507.4	11535.7
60	23897.6	12608.9	13842.9
70	27880.5	14710.4	16150.0
80	31863.4	16811.8	18457.2
90	35846.3	18913.3	20764.3
100	39829.3	21014.8	23071.5
200	79658.6	42029.6	46143.0

Hydraulic
Engines.
30
Steam-
engine.
31
Engine for
raising wa-
ter by a
multiplying
wheel.
Plate CLVI
fig. 6.

Hydraulic
Engines.

Under the article *STEAM-Engine*, the reader will find a particular account of that useful invention, with a correct description and plate of it in its improved state.

THE *multiplying machine* has no dependence on the action of the atmosphere; but, by the weight of water only, and without pump-work of any kind, raises water sufficient to serve a gentleman's seat, with an overplus for fountains, fish-ponds, &c.

AB are two copper pans or buckets of unequal weight and size, suspended to chains, which alternately wind off and on the multiplying-wheel YZ; whereof the wheel Y is smaller in diameter, and Z larger; in proportion to the different lifts each is designed to perform.

When the buckets are empty, they are stopped level with the spring at X, whence they are both filled with water in the same time.

The greater of the two A, being the heavier when full, preponderates and descends ten feet, perhaps from C to D; and the lesser, B, depending on the same axis, is thereby weighed up or raised from E to F, suppose thirty feet.

Here, by particular little contrivances, opening the valves placed at bottom of each of these buckets, they both discharge their water in the same time, through apertures proportionable to their capacities; the smaller into the cistern W, whence it is conveyed for service by the pipe T, and the larger at D, to run waste by the drain below at H. The bucket B being empty, is so adjusted as then to overweigh; and descending steadily as it rose betwixt the guiding rods VV, brings or weighs up A to its former level at X, where both being again replenished from the spring, they thence proceed as before. And thus will they continue constantly moving (merely by their circumstantial difference of water-weight, and without any other assistance than that of sometimes giving the iron-work a little oil) so long as the materials shall last, or the spring supply water.

The steadiness of the motion is in part regulated by a worm turning a jack-fly, and a little simple wheel-work at LM; which communicating with the multiplying wheel axle at M, is thereby moved forward or backward as the buckets either rise or descend. But what principally keeps the whole movement steady, is the equilibrium preserved in the whole operation by a certain weight of lead, at the end of a lever of fit length, and fixed on one of the spindles of the wheel-work, the numbers whereof are so calculated as, during the whole performance up and down, to let it move no more than one-fourth of a circle, from G to K; by which contrivance, as more or less of the chains suspending the buckets come to be wound off their respective wheels Y and Z, this weight gradually falls in as a counter-balance, and so continues the motion equable and easy in all its parts.

The water raised by this machine is not above the hundredth part of what a water-wheel will expend, to raise an equal quantity. But where a fall, proportionable to the intended rise of water, cannot be had, with a convenient sewer to carry off the waste water over and above, this device cannot be well put in practice.

WATER may also be raised by means of a stream AB turning a wheel CDE, according to the order of the

letters, with buckets *a, a, a, a*, &c. hung upon the wheel by strong pins *b, b, b, b*, &c. fixed in the side of the rim: but the wheel must be made as high as the water is intended to be raised above the level of that part of the stream in which the wheel is placed. As the wheel turns, the buckets on the right hand go down into the water, and are thereby filled, and go up full on the left hand, until they come to the top at K, where they strike against the end *n* of the fixed trough M, and are thereby overlet, and empty the water into the trough; from which it may be conveyed in pipes to the place which it is designed for: and as each bucket gets over the trough, it falls into a perpendicular position again, and goes down empty, until it comes to the water at A, where it is filled as before. On each bucket is a spring *r*, which, going over the top or crown of the bar *m*, (fixed to the trough M), raises the bottom of the bucket above the level of its mouth, and so causes it to empty all its water into the trough.

Sometimes this wheel is made to raise water no higher than its axis; and then, instead of buckets hung upon it, its spokes, C, *d, e, f, g, h*, are made of a bent form, and hollow within; these hollows opening into the holes C, D, E, F, in the outside of the wheel, and also into those at O in the box N upon the axis. So that as the holes CD, &c. dip into the water, it runs into them; and as the wheel turns, the water rises in the hollow spokes *c, d*, &c. and runs out in a stream P from the holes at O, and falls into the trough Q, from whence it is conveyed by pipes. And this is a very easy way of raising water, because the engine requires neither men nor horses to turn it.

ENGINES for extinguishing fire are either forcing or Fire-lifting-pumps; and being made to raise water with great velocity, their execution in great measure depends upon the length of their levers, and the force wherewith they are wrought.

For example, AB is the common squirting fire-engine. D C is the frame of a lifting-pump, wrought by the levers E and F acting always together. During the stroke, the quantity of water raised by the piston N spouts with force through the pipe G, made capable of any degree of elevation by means of the yielding leather-pipe H, or by a ball and socket, capable of turning every way, screwed on the top of the pump. Between the strokes on this machine the stream is discontinued. The engine is supplied by water poured in with buckets above; the dirt and filth whereof are kept from choking the pump-work by help of the strainer IK.

A considerable improvement has since been made to these machines in order to keep them discharging a continual stream. In doing whereof it is not to be understood that they really throw out more water than do the squirting ones of the same size and dimensions with themselves; but that the velocity of the water, and of course the friction of all the parts, being less violent, the stream is more even and manageable, and may be directed hither or thither with greater ease and certainty than if it came forth only by fits and starts: The machine, thus improved, is therefore generally better adapted to the purpose intended than the former, especially in the beginning of these calamitous accidents.

32
ePersian
cel.
III.
8.

Hydraulic
Engines.
Plate CLV.
fig. 16.

The stream is made continual from the spring of air confined in a strong metal vessel CC, in the fire-engine AB, fixed between the two forcing-pumps D and E, wrought with a common double lever FG moving on the centre H. The pistons in D and E both suck and force alternately, and are here represented in their different actions; as are also the respective valves at IK and LM.

The water to supply this engine, if there be no opportunity of putting the end of a sucking-pipe, occasionally to be screwed on, into a moat or canal, which would spare much hurry and labour in case of fire, is also poured into the vessel AB; and being strained through the wire-grate N, is, by the pressure of the atmosphere, raised through the valves K and M into the barrels of D or E, when either of their forcers ascend; whence again it will be powerfully pushed when they descend into the air-vessel CC, thro' the valves I and L by turns: by the force whereof the common air between the water and the top of the air-vessel O will from time to time be forcibly crowded into less room, and much compressed; and the air being a body naturally endowed with a strong and lively spring, and always endeavouring to dilate itself every way alike in such a circumstance, bears strongly both against the sides of the vessel wherein it is confined, and the surface of the water thus injected; and so makes a constant regular stream to rise through the metal pipe P into the leather one Q, screwed thereon; which being flexible, may be led about into rooms and entries, as the case may require.

Should the air contained in this vessel be compressed into half the space it took up in its natural state, the spring thereof will be much about doubled; and as before it equalled and was able to sustain the pressure of a single atmosphere, it having now a double force, by the power of that spring alone will throw water into air, of the common degree of density, about thirty feet high. And should this compressure be still augmented, and the quantity of air which at first filled the whole vessel be reduced into one-third of that space, its spring will be then able to resist, and consequently to raise the weight of a treble atmosphere; in which case, it will throw up a jet of water sixty feet high. And should so much water again be forced into the vessel as to fill three parts of the capacity, it will be able to throw it up about ninety feet high: and wherever the service shall require a still greater rise of water, more water must be thrust into this vessel; and the air therein being thus driven by main force into a still narrower compass, at each explosion, the gradual restitution thereof to its first dimensions is what regularly carries on the stream between the strokes, and renders it continual during the operation of the machine.

This experiment, in little, may be either made on the lifting or forcing pump, the nofels of which may be left large, on purpose for the reception of the small pipe F, reaching nearly to the valve at E, and occasionally to be screwed in. Between this pipe and the sides and top of the nosel H, a quantity of air will necessarily be lodged, which, when the forcer acts, will be compressed at every stroke by the rise of the water; more whereof will be pushed through E than can immediately get away through the pipe F, which

is to be always left in diameter than the opening of the valve at E. The degree of which condensation, and that of the restitution to its natural state of density, may be observed through the glass-machines to satisfaction.

ARCHIMEDES'S SCREW is a sort of spiral pump, and receives its name from its inventor. It consists of a long cylinder AB with a hollow pipe CD round it; and is placed in an oblique position, with the lower end in the water, the other end being joined to the lower end of the winch IK, supported by the upright piece IR.

When this screw is immersed in the water, it immediately rises in the pipe by the orifice C to a level with the surface of the water EF; and if the point in the spiral, which in the beginning of the motion is coincident with the surface of the water, happen not to be on the lower side of the cylinder, the water, upon the motion of the screw, will move on in the spiral till it come to the point on the other side that is coincident with the water. When it arrives at that point, which we will suppose to be O, it cannot afterwards possess any other part of the spiral than that on the lowest part of the cylinder: for it cannot move from O toward H or G, because they are higher above the horizon; and as this will be constantly the case after the water in the spiral has attained the point O, it is plain it must always be on the under side of the cylinder.

But because the cylinder is in constant motion, every part of the spiral screw, from O to D, will by degrees succeed to the under part of the cylinder. The water therefore must succeed to every part of it, from O to D, as it comes on the lower side; that is, it must ascend on the lower part of the cylinder through all the length of the pipe, till it come to the orifice at D, where it must run out, having nothing further to support it.

THERE is a simple and easy method of working two pumps at once, by means of the balance AB, having a large iron ball at each end, and placed in equilibrium on the two spindles C, as represented in the 6th figure. On the right and left are two boards I, nailed to two cross pieces, fastened to the axis of the machine. On these boards the person who is to work the pump stands, and supports himself by a cross piece nailed to the two posts ED, fig. 5. At the distance of ten inches on each side the axis, are fastened the pistons MN.

The man, by leaning alternately on his right and left foot, puts the balance in motion, by which the pumps OP are worked, and the water thrown into the pipe H, and carried to a height proportional to the diameter of the valves, and the force of the balance. There must be placed on each side an iron spring, as F and G, to return the balance, and prevent its acquiring too great velocity.

THE Chain-pump, AB, is ordinarily made from twelve to twenty-four feet long; and consists of two collateral square barrels, and a chain of pistons of the same form, fixed at proper distances thereon. The chain is moved in these round a coarse kind of wheelwork at either end of the machine, the teeth whereof are so made as to receive one half of the flat pistons, and let them fold in; and they take hold of the links as they rise in one of the barrels, and return by the other. The machine is wrought either by the turning

³⁴ The screw
of Archi-
medes.
Plate CLIV
fig. 4.

³⁵ The balance-
pumps,
fig. 5, 6.

³⁶ The chain-
pump.
Plate CLV
fig. 3.



Fig. 7.



Fig. 5.

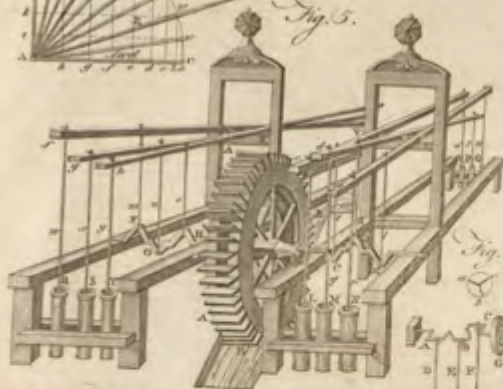


Fig. 1.



Fig. 2.



Fig. 3.

Fig. 4.

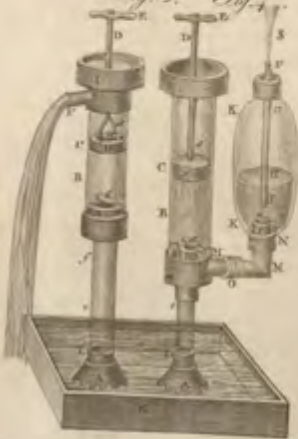


Fig. 8.







Entertain-
ing experi-
ments.

of one handle or two, according to the labour required, depending on the height to which the water is to be raised. A whole row of the pistons (which go free of the sides of the barrel by perhaps a quarter of an inch) are always lifting when the pump is at work; yet do they, by the general push in the ordinary way of working, as it is pretty brisk, commonly bring up a full bore of water in the pump. This machine is so contrived, that, by the continual folding in of the pistons, stones, dirt, and whatever happens to come in the way, may also be cleared; and therefore it is generally made use of to drain ponds, to empty sewers, and remove foul waters, in which no other pump could work.

37
The hy-
draulic
pump.
Plate CLIV
fig. 9.

This last machine to be described consists of five pieces of board, forming a sort of scoop, as B. The handle C is suspended by a rope fastened to three poles, placed in a triangle, and tied together at A.

The working of this machine consists entirely in balancing the scoop that contains the water, and directing it in such manner that the water may be thrown in any given direction. It is evident that the operation of this machine is so very easy, that it may rather be considered as an agreeable and salutary recreation than hard labour.

With this machine a man of moderate strength, by two strokes in four seconds, can draw half a cubic foot of water, that is, more than four hundred cubic feet in an hour.

This machine is frequently used by the Dutch in emptying the water from their dikes.

SECT. VI. Entertaining Experiments.

38
The sy-
phon dis-
cussed.
Tantalus's
p., &c.
Plate CLV

1. SEVERAL amusing appearances may be produced by disguising or diversifying a syphon. It may, for example, be disguised in a cup, from which no liquor will flow till the fluid is raised therein to a certain height; but when the efflux is once begun, it will continue till the vessel is emptied. Thus, fig. 11. is a cup, in the centre whereof is fixed a glass pipe A, continued through the bottom at B, over which is put another glass tube, made air-tight at top by means of the cork at C; but left so open at foot, by holes made at D, that the water may freely rise between the tubes as the cup is filled. Till the fluid in the cup shall have gained the top of the innermost pipe at A, no motion will appear: The air however from between the two pipes being in the mean time extruded, by the rise of the denser fluid, and passing down the inner tube, will get away at bottom; and the water, as soon as the top of the inclosed tube shall be covered thereby, will very soon follow, and continue to rise in this machine, as in the syphon, till the whole is run off.

This is called by some, a *Tantalus's cup*; and, to humour the thought, a hollow figure is sometimes put over the inner tube, of such a length, that when the fluid is got nearly up to the lips of the man, the syphon may begin to act and empty the cup.

This is in effect no other than if the two legs of the syphon were both within the vessel, as in fig. 12. into which the water poured will rise in the shorter leg of the machine, by its natural pressure upwards, to its own level; and when it shall have gained the bend of the syphon, it will come away by the longer leg, as already described. An apple, an orange, or any other

solid, may be put into the vessel, to raise the water, when it is near the bend, to set it a-running, by way of amusement.

Again, let the handle of the cup, fig. 8. be hollow; let the tube CD, screwed therein, communicate freely with the water poured into the cup, that it may rise equally in both. Being once above the level ED, it will overflow, and, descending through the cavity DB, will empty the cup of its liquor.

2. The device called the *fountain at command*, acts upon the same principle with the syphon in the cup. Let two vessels A and B be joined together by the pipe C, which opens into them both. Let A be opened at top, B close both at top and bottom, (save only a small hole at *b* to let the air get out of the vessel B,) and A be of such a size as to hold about six times as much water as B. Let a syphon DEF be soldered to the vessel D, so that the part DE may be within the vessel, and F without it; the end D almost touching the bottom of the vessel, and the end F below the level of D: the vessel B hanging to A by the pipe C (folded into both), and the whole supported by the pillars G and H upon the stand I. The bore of the pipe must be considerably less than the bore of the syphon.

39
The foun-
tain at com-
mand.
Plate CLIII
fig. 2.

The whole being thus constructed, let the vessel A be filled with water, which will run through the pipe C, and fill the vessel B. When B is filled above the top of the syphon at E, the water will run through the syphon, and be discharged at F. But as the bore of the syphon is larger than the bore of the pipe, the syphon will run faster than the pipe, and will soon empty the vessel B; upon which the water will cease from running through the syphon at F, until the pipe C refills the vessel B, and then it will begin to run as before. And thus the syphon will continue to run and stop alternately, until all the water in the vessel A has run through the pipe C.—So that, after a few trials, one may easily guess about what time the syphon will stop, and when it will begin to run; and then, to amuse others, he may call out "*stop*," or "*run*," accordingly.

3. This fig. represents a very pretty portable fountain, which, being charged with water, and inverted, will play a jet nearly as high as the reservoir, till the fluid is exhausted; and then turned up on the other end, the same thing will happen, and a real clepsydra, or water-clock, be thereby formed.

This device consists of two hollow vessels, A and B, communicating with each other only by the recurved tubes C and D; at the ends of which, E and F, are placed small adjutages to direct the jet. G and H are two open tubes, soldered into the bottom of the basins belonging to A and B, through which the water flows in, and fills those vessels to a certain height, that is, according to their length. They by their disposition also prevent the return of the water the same way, when the machine is turned upside down.

4. Provide a cylindric vessel of glass or china, ABCD, about a foot high, and four inches diameter. Make a hole in its bottom, in which glue a small glass-tube E, of about one-third of an inch diameter, and whose end has been partly closed in the flame of a lamp, so that it will not suffer the water to pass out but by drops, and that very slowly. Cover the top of the ves-
sel

40
Portable
fountain
clock, or
clepsydra.
Plate CLV.
fig. 18.

41
Hydro-
scope, or
water-
clock.
Plate CLVI.
fig. 4.

Entertain-
ing experi-
ments.

Entertain-
ing experi-
ments.

fel with a circle of wood F, in the centre of which make a round hole about half an inch diameter.

Have a glass-tube GH, a foot high, and a quarter of an inch diameter; and at one end let it have a small glass globe I, to which you may hang a weight L, by which it is kept in *equilibrium*, on or near the surface of the water; or you may pour a small quantity of mercury into the tube, for the same purpose. Fill the vessel with water; put the tube in it, and over it place the cover F, through the hole of which the tube must pass freely up and down. Now, as the water drops gradually out of the vessel, the tube will continue to descend till it come to the bottom.

Therefore, paste on the tube a graduated paper, and put it in the vessel when nearly full of water. Hang a watch by it, set to a certain hour; and as the tube descends, mark the hours, with the half and quarter hours. If the vessel be sufficiently large, with regard to the hole at the bottom, it will go for 12 hours, a day, or as much longer as you please, and requires no other trouble than that of pouring in water to a certain height. Care must be had, however, that the water be clean; for if there be any sediment, it will in time stop the small hole at bottom, or at least render the motion of the water irregular.

The vessel may be of tin, but the pipe at bottom should be glass, that its small aperture may not alter by use. It is to be observed, that the tube of one of these clocks is not to be graduated by another: for though the vessel be of the same diameter at top, it may not be perfectly cylindrical throughout; nor is it easy to make the hole at the bottom of one vessel exactly of the same dimension with that of another.

42.
Clepsydra.
Plate CLVI.
fig. 7.

5. The hon. Mr Charles Hamilton has described a curious clepsydra or water-clock of new construction. An open canal *ee*, supplied with a constant and equal stream by the syphon *d*, has at each end *ff* open pipes of exactly equal bores, which deliver the water that runs along the canal *e*, alternately into the vessels *g* 1, *g* 2, in such a quantity as to raise the water from the mouth of the tantalus *t*, exactly in an hour. The canal *ee* is equally poised by the two pipes *f* 1, *f* 2, upon a centre *r*, the ends of the canal *e* are raised alternately, as the cups *z* *z* are depressed, to which they are connected by lines running over the pulleys *ll*. The cups *z* *z* are fixed at each end of the balance *mm*, which moves up and down upon its centre *v*. *n* 1, *n* 2, Are the edges of two wheels or pulleys, moving different ways alternately, and fitted to the cylinder *o* by oblique teeth both in the cavity of the wheel and upon the cylinder, which, when the wheel *n* moves one way, that is, in the direction of the minute-hand, meet the teeth of the cylinder and carry the cylinder with it, and, when *n* moves the contrary way, slip over those of the cylinder, the teeth not meeting, but receding from each other. One or other of these wheels *nn* continually moves *o* in the same direction, with an equable and uninterrupted motion. A fine chain goes twice round each wheel, having at one end a weight *x*, always out of water, which equi-ponderates with *y* at the other end, when kept floating on the surface of the water in the vessel *g*, which *y* must always be; the two cups *z* *z*, one at each end of the balance, keep it in *equilibrium*, till one of them is forced down by the weight and impulse of the water, which

it receives from the tantalus *t* *t*: each of these cups *z* *z*, has likewise a tantalus of its own *b*, *b*, which empties it after the water has done running from *g*, and leaves the two cups again in *equilibrium*; *q* is a drain to carry off the water. The dial-plate, &c. needs no description. The motion of the clepsydra is effected thus: As the end of the canal *ee*, fixed to the pipe *f* 1, is, in the figure, the lowest, all the water supplied by the syphon runs through the pipe *f* 1, into the vessel *g* 1, till it runs over the top of the tantalus *t*; when it immediately runs out at *i* into the cup *z*, at the end of the balance *m*, and forces it down; the balance moving on its centre *v*. When one side of *m* is brought down, the string which connects it to *f* 1, running over the pulley *l*, raises the end *f* 1, of the canal *e*, which turns upon its centre *r*, higher than *f* 2; consequently, all the water which runs through the syphon *d* passes through *f* 2 into *g* 2, till the same operation is performed in that vessel, and so on alternately. As the height the water rises in *g* in an hour, viz. from *i* to *t*, is equal to the circumference of *n*, the float *y* rising thro' that height along with the water, lets the weight *x* act upon the pulley *n*, which carries with it the cylinder *o*; and this, making a revolution, causes the index *k* to describe an hour on the dial-plate. This revolution is performed by the pulley *n* 1; the next is performed by *n* 2, whilst *n* 1 goes back, as the water in *g* 1 runs out through the tantalus; for *y* must follow the water, as its weight increases, out of it. The axis *a* always keeps moving the same way; the index *p* describes the minutes; each tantalus must be wider than the syphon, that the vessels *gg* may be emptied as low as *j*, before the water returns to them.

6. To the tube wherein the water is to rise, fit a spherical or lenticular head, AB, made of a plate of metal, and perforated at top with a great number of little holes. The water rising with vehemence towards AB, will be there divided into innumerable little threads, and afterwards broke, and dispersed into the finest drops.

7. To the tube AB, solder two spherical segments C and D, almost touching each other; with a screw E, which spreads the tube to contract or amplify the interstice or chink at pleasure. Others choose to make a smooth, even cleft, in form of a spherical or lenticular head, fitted upon the tube. The water spouting through the chink, or cleft, will expand itself in manner of a cloth.

8. Make a hollow globe A, of copper or lead, and of the size adapted to the quantity of water that comes from the pipe to which it is to be placed. Pierce a number of small holes thro' this globe, that all tend towards its centre; observing, however, that the diameters of all these holes, taken together, must not exceed that of the pipe at the part from whence the water flows. Annex to it a pipe B, of such height as you think convenient; and let it be screwed at C, to the pipe from whence the jet flows. The water that comes from the jet rushing with violence into the globe, will be forced out at the holes, with the direction in which they are made, and will produce a very pleasing sphere of water.

9. Procure a little figure made of cork, as AB, The which you may paint, or dress in a light stuff, after drauc your own fancy. In this figure you are to place danc, the small hollow cone C, made of thin leaf brads. When the figure is placed on the jet-d'eau that plays

43.
A fountain
spouts wa-
ter in form
of a flower
fig. 2.

44.
A fountain
which
spreads the
water in
a table-cloth
fig. 3.

45.
The glob-
lar fount-
Plate CLVI
fig. 11.

46.
The hy-
after drauc
your own fancy.
fig. 17.

entertain-
g experi-
cuis.

in a perpendicular direction, it will remain suspended on the top of the water, and perform a great variety of motions.

If a hollow ball of copper, of an inch diameter, and very light, be placed on a similar jet, it will, in like manner, remain suspended, revolving on its centre, and spreading the water all round it, in the manner represented by fig. 14. or Plate CLVI. fig. 1.—But note, that as it is necessary the ball, &c. when on the defect, should keep the fame precise perpendicular wherein it rose (since otherwise it would miss the stream and fall downright,) such a fountain should only be played in a place free from wind.

47
the hemi-
cal
cascade.
CLV.
10.

10. Make a hollow leaden cone A, whose axis is one-third of the diameter of its base. The circle C, that forms its base, must be in proportion to the surface of water that flows from the jet on which it is to be placed, that it may flow from it equally on all sides. To the cone join the pipe B, which serves not only as a support, but is to be pierced with a number of holes, that it may supply the cone with a sufficient quantity of water. Screw the tube just mentioned to the top of that from whence the jet proceeds.—The water that rushes into the cone from the pipe, will run over its circumference, and form a hemispherical cascade. If this piece be so constructed that it may be placed in a reversed position, it will produce a fountain in the form of a vase, (see fig. 8.); and if there be a sufficient quantity of water, both these pieces may be placed on the same pipe, the fountain at top and the cascade underneath, which by their variety will produce a very pleasing appearance.

48
water-
CLVI.
5.

11. Let there be two portions of a hollow sphere, that are very shallow : and let them be joined together, that the circular space between them may be very narrow. Fix them vertically to a pipe from whence a jet proceeds. In that part by which the portions of the sphere are joined, there must be made a number of holes; then the water rushing into the narrow cavity will be forced out from the holes, and produce a regular figure of the sun, as in the plate. This piece requires a large quantity and force of water to make it appear to advantage.

CLV.
Several pieces of this sort may be placed over each other, in a horizontal direction, and so that the same pipe may supply them all with water (see fig. 7.) It is proper to observe, that the diameter of these pieces must continually diminish, in proportion to their distance from the bottom.

49
revol-
water-
CLV.
11.

12. Make a hollow circle A, the sides of which are to be pierced with 12 or 15 holes, made in an inclined direction : or you may place the like number of small tubes round the circle. Fix this circle on the top of a jet, in such manner that it may turn freely round. The water rushing violently into the hollow circle will keep it in continual motion ; and at the same time forcing out of the holes or small tubes, will form a revolving figure with rays in different directions, as in the plate.

50
com-
cu jet
12.

13. Provide a strong copper vessel A, of such figure as you think convenient ; in which solder a pipe BE, of the same metal. Let there be a cock at H, which must be made so tight that no air can pass by it. The pipe BE must go very near the bottom of the vessel, but not touch it. There must be another pipe F, at whose

extremity G there is a very small hole : this pipe must be screwed into the former.

The vessel being thus disposed, take a good syringe ; and placing the end of it in the hole at G, open the cock, and force the air into the vessel ; then turn the cock and take out the syringe. Repeat this operation several times, till the air in the vessel be strongly condensed. Then fill the syringe with water, and force it into the vessel, in the same manner as you did the air ; and repeat this operation till you can force no more water into the vessel ; then shut the cock. This vessel will be always ready to perform an extempore jet d'eau : for, on turning the cock, the spring of the compressed air will force out the water with great violence, and the jet will continue, tho' constantly decreasing in force, till the water is all exhausted, or the air within the vessel is come to the same density with that without.

14. Let there be made a tin vessel, about six inches high, and three inches in diameter. The mouth of this vessel must be only one quarter of an inch wide ; and in its bottom make a great number of small holes, about the size of a common sewing needle. Plunge this vessel in water, with its mouth open ; and when it is full, cork it up and take it out of the water. So long as the vessel remains corked, no water whatever will come out, but as soon as it is uncorked, the water will issue from the small holes at its bottom. You must observe, that if the holes at the bottom of the vessel be more than one-sixth of an inch diameter, or if they be in too great number, the water will run out tho' the vessel be corked ; for then the pressure of the air against the bottom of the vessel will not be sufficient to confine the water.

An experiment similar to this is made with a glass filled with water, over which a piece of paper is placed. The glass is then inverted ; and the water, by the pressure of the air under it, will remain in the glass. That the paper, tho' the seeming, is not the real, support of the water, will appear from n° 20.

51
A glass full
of water in-
verted, and
the water
not spilt.
Fig. 13.

53
The circu-
lating foun-
tain, fig. 10.

15. In this fountain the boxes CE and DYX being close, you see only the basin ABW, with a hole at B, through which the water that spouts out at B falls and runs down through the pipe WX into the box DYX, from whence it drives out the air, through the ascending pipe YZ, into the cavity of the box CE, where pressing upon the water contained in that box, it forces it out, through the spouting pipe OB, as long as there is any water in CE ; so that the continuance of the play is while the water in CE spouts out and falls down through the pipe WX, into the cavity DYX. The force of the jet is in proportion to the height of the pipe WX, or of the distance between the boxes CE and DY. The height of the water, measured from the basin ABW to the surface of the water in the lower box DYX, is always equal to the height, measured from the top of the jet to the surface of the water in the middle cavity CE. Now, since the surface CE is always falling, and the water DY is always rising, the height of the jet must continually decrease, till it is shorter by the depth of the cavity CE, which is emptying, added to the depth of the cavity DY, which is always filling ; and when the jet is fallen so low, it immediately ceases.

The method of preparing this fountain is as follows. First, pour water in at W, till you have filled the cavity

Entertain-
ing experi-
ments.

Entertain-
ing experi-
ments.

vity DXY: then turn the fountain over, and the water will run from the cavity DXY, into the cavity CE, which you will know to be full by the water's running out at B when it is held down. Set the fountain up again, and pour about a pint of water into the bafon ABW; and as soon as it has filled the pipe WX, the fountain will play, and continue as long as there is any water in CE. You may then empty the water left in the bafon into any other vefel, and invert the fountain; which, upon being placed again erect, will begin to play, when the water poured out of the bafon is put into it again. There are fountains of this fort that have four pipes, inftead of two, and by that means the water is forced up to twice the height it is in this. See alfo n^o 40.

54
The magi-
cal cascade,
fig. 9.

16. Procure a tin vefel ABC, five inches high and four in diameter; and let it be clofed at top. To the bottom of this vefel let there be foldred the pipe DE, of ten inches length and half an inch in diameter: this pipe muft be open at each end, and the upper end muft be above the water in the vefel. To the bottom alfo fix five or fix fmall tubes F, about one-eighth of an inch diameter. By thefe pipes the water contained in the vefel is to run flowly out.

Place this machine on a foot of tin bafon GH, in the middle of which is a hole of one quarter of an inch diameter. To the tube DE, fix fome pieces that may fupport the vefel over the bafon; and obferve that the end D, of the tube DE, muft be little more than one quarter of an inch from the bafon. There muft be alfo another vefel placed under the bafon, to receive the water that runs from it.

Now, the fmall pipes difcharging more water into the bafon than can run out at the hole in its centre, the water will rife in the bafon, above the lower end of the pipe DE, and prevent the air from getting into the vefel AB; and confequently the water will ceafe to flow from the fmall pipes. But the water continuing to flow from the bafon, the air will have liberty again to enter the vefel AB, by the tube DE, and the water will again flow from the fmall pipes. Thus they will alternately flop and flow, as long as any water remains in the vefel AB.

As you will eafily know, by obferving the rife of the water, when the pipes will ceafe to flow, and by the fall of it, when they will begin to run again, you may fafely predict the change; or you may command them to run or flop, and they will feem to obey your orders.

55
The illumi-
nated foun-
tain, fig. 4.

17. This fountain begins to play when certain candles placed round it are lighted, and flops when thofe candles are extinguiſhed. It is contructed as follows. Provide two cylindrical vefels, AB and CD. Connect them by tubes open at both ends, as HL, FB, &c. fo that the air may defcend out of the higher into the lower vefel. To thefe tubes fix candleſticks H, &c. and to the hollow cover CF, of the lower vefel, fit a fmall tube EF, furniſhed with a cock G, and reaching almoſt to the bottom of the vefel. In G let there be an aperture with a ſcrew, whereby water may be poured into CD.

Now, the candles at H, &c. being lighted, the air in the contiguous pipes will be thereby rarified, and the jet from the fmall tube EF will begin to play: as the air becomes more rarified, the force of the jet will

increase, and it will continue to play till the water in the lower vefel is exhauſted. It is evident, that as the motion of the jet is caufed by the heat of the candles, if they be extinguiſhed, the fountain muſt prefently flop.

18. The motion of the water in this fountain is produced by the heat of the fun, in the following manner. GNS is a thin hollow globe of copper, of 18 inches diameter, fupported by a ſmall inverted bafon, placed on a frame with four legs ABCD, which have between them, at the bottom, a bafon of two feet diameter. Through the leg C paffes a concealed pipe, which comes from G, the bottom of the infide of the globe: this pipe goes by HV, and joins the upright pipe uI, to make a jet at I. The ſhort pipe uI, which goes to the bottom of the bafon, has a valve at V, under the horizontal pipe H u, and another valve at V, above that horizontal pipe, under the cock at K. The ufe of this cock is to keep the fountain from playing in the day, till you think proper. The north pole N of the globe has a ſcrew that opens a hole, whereby water is poured into the globe.

The machine being thus prepared, and the globe half filled with water, let it be fet in an open place, when the heat of the fun, rarifying the air as it heats the copper, the air will prefs ſtrongly againſt the water, which coming down the pipe GCHVI, will lift up the valve V, and ſhut the valve u. The cock being opened, the water will ſpout out at I, and continue to play a long time, if the fun ſhine.

At night, when the air is condenſed, that which is on the outside of the vefel will prefs on the adjutage I, and ſhut the valve V; and at the ſame time preſſing on the water in the bafon DuH, which has been played in the day, will puſh it up, through the valve u, and pipe uHG, into the globe, fo as to fill it again, to the ſame height as at firſt. When the fun ſhines again on the globe, the fountain will play again, &c. A ſmall jet will play fix or eight hours.

If the globe be fet to the latitude of the place, and rectified before it be fixed, with the hour-lines or meridians drawn upon it, the hours marked, and the countries painted, as on the common globe, it will form a good dial; the fun then ſhining upon the ſame places in this globe, as it does on the earth itſelf. This fountain was invented by Dr Defaguliers.

19. There is a pretty contrivance, by which the ſpecific gravity of the body is ſo altered, that it rife and ſinks in water at our pleaſure. Let little images of men, vers.

about an inch high, of coloured glaſs, be beſpoke at a glaſs-houſe; and let them be made ſo as to be hollow within, but ſo as to have a ſmall opening into this hollow, either at the ſole of the foot or elfewhere. Let them be fet afloat in a clear glaſs-phial of water, filled within about an inch of the mouth of the bottle; then let the bottle have its mouth cloſed with a bladder, cloſely tied round its neck, ſo as to let no air eſcape one way or the other. The images themſelves are nearly of the ſame ſpecific gravity with water, or rather a little more light, and confequently float near the ſurface. Now when we prefs down the bladder, tied on at the top, into the mouth of the bottle, and thus prefs the air upon the ſurface of the water in the bottle; the water being preſſed will force into the hollow of the image through the little opening: thus the air within

56
The ſolar
fountain,
fig. 12.

57
The hy-
draulic di-
vers.

HYDROSTATICS.

Plate CLV.

Fig. 1.

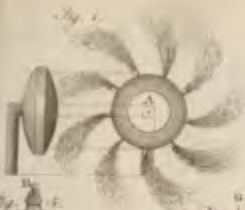


Fig. 2.



Fig. 3.



Fig. 4.



Fig. 7.



Fig. 9.



Fig. 10.



Fig. 11.



Fig. 12.



Fig. 17.

Fig. 18.



Fig. 14.

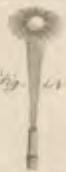


Fig. 13.

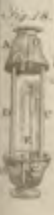
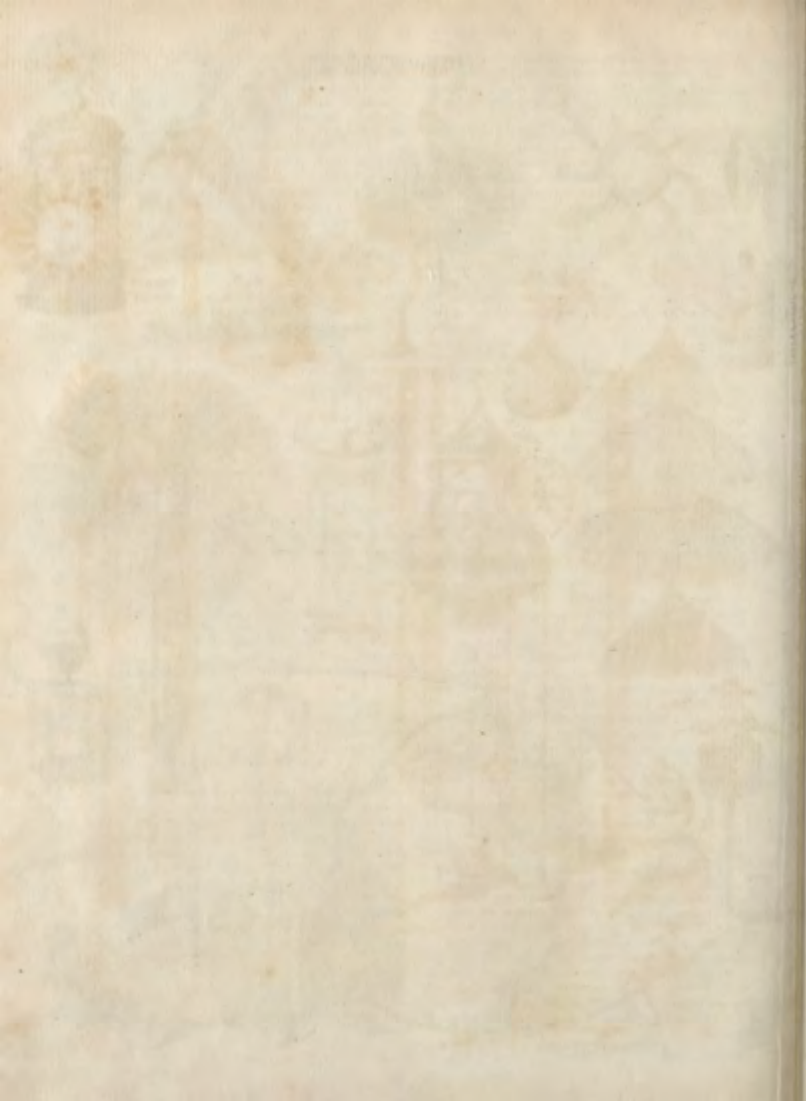


Fig. 16.

Fig. 15.



W. H. H. H.



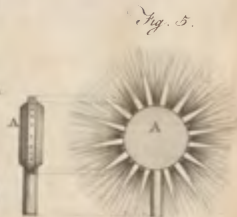
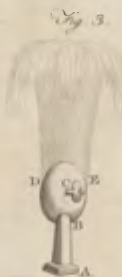


Fig. 6.

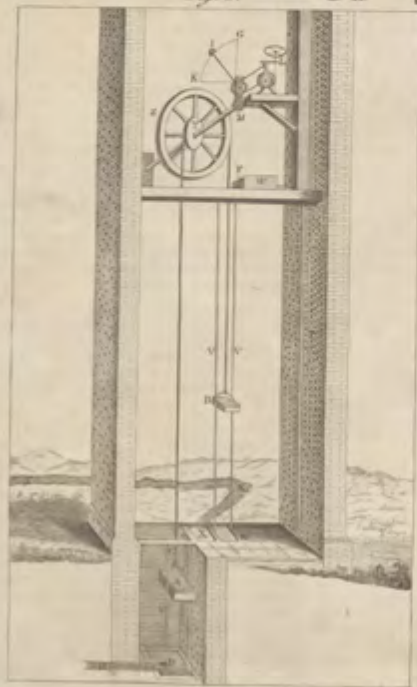
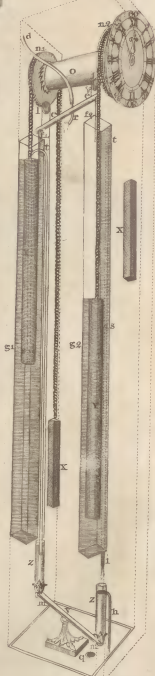


Fig. 7.



A. Ball's del.

Hydrothorax within the images will be pressed more closely together, and being also more filled with water now than before, the images will become more heavy, and will consequently descend to the bottom; but, upon taking off the pressure from above, the air within them will again

drive out the water, and they will rise to the same heights as before. If the cavities in some of the images be greater than those in others, they will rise and fall differently, which makes the experiment more amusing.

Hygrometer.

H Y G

HYDROTHORAX, a collection of water in the breast. See (the Index subjoined to) **MEDICINE**.

HYGINUS (Caius Julius), a grammarian, the freedman of Augustus, and the friend of Ovid, was born in Spain, or, according to others, in Alexandria. He wrote many books which are mentioned by ancient authors; all of which are lost, except some fables, and a work entitled *Astronomicum Poeticum*; and even these are come down to us very imperfect. The best edition of these remains is that of Munkler, published with some other pieces of antiquity in 2 vols 8vo, 1681, under the title of *Mythographi Latini*.

HYGROMETER, an instrument for measuring the degrees of dryness or moisture of the atmosphere, in like manner as the barometer and thermometer measure its different degrees of gravity or warmth.

Though every substance which swells in moist, and shrinks in dry weather, is capable of becoming an hygrometer; yet this kind of instrument is far from being as yet arrived at such a degree of perfection as the barometers and thermometers. There are three general principles on which hygrometers have been constructed. 1. The lengthening and shortening of strings by dryness and moisture, or their twisting and untwisting by the same. 2. The swelling and shrinking of solid substances by moisture or dryness; and, 3. By the increase or decrease of the weight of particular bodies whose nature is to absorb the humidity of the atmosphere.

1. On the first of these principles Mr Smeaton hath constructed an hygrometer greatly superior to any that had appeared before, and of which the following account is given in the 62d volume of the Philosophical Transactions.

“Having some years ago attempted to make an accurate and sensible hygrometer by means of a hempen cord of a considerable length, I quickly found, that, though it was more than sufficiently susceptible of every change in the humidity of the atmosphere, yet the cord was upon the whole in a continual state of lengthening. Though this change was the greatest at first, yet it did not appear probable that any given time would bring it to a certainty; and, furthermore, it seemed, that as the cord grew more determinate in mean length, the alteration by certain differences of moisture grew less. Now, as on considering wood, catgut, paper, &c. there did not appear to be a likelihood of finding any substance sufficiently sensible of differences of moisture that would be unalterable under the same degrees thereof; this led me to consider of a construction which would readily admit of an adjustment; so that, though the cord whereby the instrument is actuated may be variable in itself, both as to absolute length and difference of length under given degrees of moisture, yet that, on supposition of a material departure from its original scale, it might be readily restored thereto; and, in consequence, that any number of hygrometers similarly constructed, might,

VOL. V.

H Y G

like thermometers, be capable of speaking the same language.

“The two points of heat the more readily determinable in a thermometer, are the points of freezing and boiling water. In like manner, to construct hygrometers which shall be capable of agreement, it is necessary to establish two different degrees of a moisture which shall be as fixed in themselves, and to which we can have recourse as readily and as often as possible.

“One point is given by making the substance perfectly wet, which seems sufficiently determinable; the other is that of perfect dry, which I do not apprehend to be attainable with the same precision. A readiness to imbibe wet, so that the substance may be soon and fully saturated, and also a facility of parting with its moisture on being exposed to the fire to dry; at the same time, that neither immersion, nor a moderate exposition to the warmth of the fire, shall injure its texture; are properties requisite to the first mover of such an hygrometer, that in a manner exclude all substances that I am acquainted with, besides hempen and flaxen threads and cords, or substances compounded of them.

“Upon these ideas, in the year 1758, I constructed two hygrometers as nearly alike as possible, in order that I might have the means of examining their agreement or disagreement on similar or dissimilar treatment. The interval or scale between dry and wet I divided into 100 equal parts, which I call the degrees of this hygrometer. The point of 0 denotes perfect dry; and the numbers increase with the degrees of moisture to 100, which denotes perfect wet.

“On comparing them for some time, when hung up together in a passage or staircase, where they would be very little affected by fire, and where they would be exposed to as free an air as possible in the inside of the house, I found that they were generally within one degree, and very rarely differed two degrees; but as these comparisons necessarily took up some time, and were frequently interrupted by long absences from home, it was some years before I could form a tolerable judgment of them. One thing I soon observed, not altogether to my liking, which was, that the flaxen cords made use of seemed to make so much resistance to the entry of small degrees of moisture, (such as is commonly experienced within doors in the situation above-mentioned), that all the changes were comprised within the first 30° of the scale; but yet, on exposing them to the warm steam of a wash-house, the index quickly mounted to 100. I was therefore desirous of impregnating the cords with something of a saline nature, which should dispose them more forcibly to attract moisture; in order that the index might, with the ordinary changes of the moisture in the atmosphere, travel over a greater part of the scale of 100. How to do this in a regular and fixed quantity, was the subject of many experiments, and several years interrupted inquiry. At last I tried the one hereafter described, which seemed to answer my intention in a great measure; and the other

21 Q upon

upon the whole it does not appear probable that ever this instrument will be made capable of such an accurate agreement as the mercurial thermometers are, yet if we can reduce all the disagreements of an hygrometer within $\frac{1}{100}$ th part of the whole scale, it will probably be of use in some philosophical inquiries, in lieu of instruments which have not yet been reduced to any common scale at all.

" Fig. 1. and 2. ABC is an orthographic delineation of the whole instrument seen in front in its true proportion. DE is that of the profile, or instrument seen edgewise. FG in both represents a flaxen cord about 35 inches long, suspended by a turning peg F, and attached to a loop of brads-wire at A, which goes down into the box cover H, and defends the index, &c. from injury; and by a glass exposes the scale to view.

" Fig. 3. shews the instrument to a larger scale, the upright part being shortened, and the box-cover removed; in which the same letters represent the same parts as in the preceding figures; GI are two loops or long links of brads-wire, which lay hold of the index KL, moveable upon a small stud or centre K. The cord FG is kept moderately strained by a weight M of about half a pound avoirdupois.—It is obvious, that, as the cord lengthens and shortens, the extreme end of the index rises and falls, and successively passes over N 2 the scale disposed in the arch of a circle, and containing 100 equal divisions. This scale is attached to the brads sliding ruler QP, which moves upon the directing piece RR, fixed by screws to the board, which makes the frame or base of the whole; and the scale and ruler NQP is retained in any place nearer to, or further from, the centre K, as may be required by the screw S.

" Fig. 4. represents in profile the sliding piece and stud I (fig. 3.), which traverses upon that part of the index next the centre K; and which can, by the two screws of the stud, be retained upon any part of the index that is made parallel; and which is done for three or four inches from the centre, for that purpose. The stud is filed to the edges, like the fulcrum of a scale-beam; one being formed on the under-side, the other on the upper, and as near as may be to one another. An hook formed at the lower end of the wire-loops CI, retains the index, by the lowermost edge of the stud; while the weight M hangs by a small hook upon the upper edge: by these means the index is kept steady, and the cords strained by the weight, with very little friction or burthen upon the central stud K.

" Fig. 5. is a parallelogram of plate brads, to keep out dust, which is attached to the upper edge of the box-cover H; and serves to shut the part of the box-cover necessarily cut away, to give leave for the wire GI to traverse with the sliding stud nearer to or further from the centre of the index K; and where, in fig. 5. *a* is an hole of about an inch diameter, for the wire GI to pass through in the rising and falling of the index freely without touching; *b* is a slit of a lesser size, sufficient to pass the wire, and admit the cover to come off without deranging the cord or index; *cc* are two small screws applied to two slits, by which the plate slides lengthways, in order to adapt the hole *a* to the wire GI, at any place of the stud I upon the

index KL.

" 1. In this construction, the index KL being 12 inches long, 4 inches from the extreme end are filed so narrow in the direction in which it is seen by the eye, that any part of these four inches lying over the divisions of the scale, becomes an index thereto. The scale itself slides four inches, so as to be brought under any part of the four inches of the index attenuated as above-mentioned.

" 2. The position of the directing piece RR is so determined as to be parallel to a right line drawn thro' o upon the scale, and the centre K of the index; consequently, as the attenuated part of the index forms a part of a radius or right line from the same centre, it follows, that whenever the index points to o upon the scale, though the scale is moved nearer to or further from the centre of the index, yet it produces no change in the place to which the index points.

" 3. When the divided arch of the scale is at 10 inches from the centre, (that is, at its mean distance); then the centre of the arch and the centre of the index are coincident. At other distances, the extremes of which are eight or twelve inches, the centre of the divisions, and the centre of the index pointing thereto, not being coincident, the index cannot move over the spaces geometrically proportionable to one another in all situations of the scale, yet, the whole scale not exceeding 30° of a circle, it will be found on computation, that the error can never be so great as $\frac{1}{100}$ th part of the scale, or 1° of the hygrometer; which in this instrument being considered as indivisible, the mechanical error will not be sensible.

" The cord here made use of is flax, and between $\frac{3}{16}$ th and $\frac{1}{8}$ th of an inch in diameter; which can be readily ascertained by measuring a number of turns made round a pencil or small stick. It is a sort of cord used in London for making nets, and is of that particular kind called by net-makers *flaxen three-threads laid*. A competent quantity of this cord was boiled in one pound avoirdupois of water, in which was put two pennyweights troy of common salt; the whole was reduced by boiling to six ounces avoirdupois, which was done in about half an hour. As this ascertains a given strength of the brine, on taking out the cord; it may be supposed that every fibre of the cord is equally impregnated with salt. The cord being dried, it will be proper to stretch it; which may be done so as to prevent it from untwisting, by tying three or four yards to two nails against a wall, in an horizontal position, and hanging a weight of a pound or two to the middle, so as to make it form an obtuse angle. This done for a week or more in a room, will lay the fibres of the cord close together, and prevent its stretching so fast after being applied to the instrument, as it would otherwise be apt to do.

" The hygrometer is to be adjusted in the following manner. The box-cover being taken off to prevent its being spoiled by the fire, and choosing a day naturally dry, set the instrument nearly upright, about a yard from a moderate fire; so that the cord may become dry, and the instrument warm, but not so near as would spoil the finest linen by too much heat, and yet fully evaporate the moisture; there let the instrument stay till the index is got as low as it will go; now and then stroaking the cord betwixt the thumb

and

and finger downwards, in order to lay the fibres thereof close together; and thereby causing it to lengthen as much as possible. When the index is thus become stationary, which will generally happen in about an hour, more or less, as the air is naturally more or less dry, by means of the peg at top raise or depress the index, till it lies over the point *o*. This done, remove the instrument from the fire; and having ready some warm water in a tea-cup, take a middling camel's-hair pencil, and, dipping it in the water, gently anoint the cord till it will drink up no more, and till the index becomes stationary and water will have no more effect upon it, which will also generally happen in about an hour. If in this state the index lies over the degree marked 100, all is right; if not, slack the screw *S*, and slide the scale nearer to or further from the centre, till the point 100 comes under the index, and then the instrument is adjusted for use: but if the compass of the slide is not sufficient to effect this, as may probably happen on the first adjustment, slack the proper screws, and move the sliding studd *I* nearer to or further from the centre of the index, according as the angle formed by the index between the two points of dry or wet happens to be too small or too large for the scale."

1. On the second general principle, namely, that of the swelling of solid bodies by moisture, and their contraction by dryness, Mr De Lac's is the best. He makes choice of ivory for the construction of his hygrometer, because he finds, that, being once wetted, ivory regularly swells by moisture, and returns exactly to the same dimensions when the moisture is evaporated, which other bodies do not. This hygrometer is represented in fig. 6. *aab* is an ivory tube open at the end *aa*, and close at *b*. It is made of a piece of ivory taken at the distance of some inches from the top of a pretty large elephant's tooth, and likewise at the same distance from its surface, and from the canal which reaches to that point. (This particular direction is given, that the texture of the ivory in all different hygrometers may be the same, which is of great importance.) This piece is to be bored exactly in the direction of its fibres; the hole must be very straight, its dimensions $2\frac{1}{2}$ lines in diameter, and 2 inches 8 lines in depth from *aa* to *c*. Its bore is then to be exactly filled with a brass cylinder, which, however, must project somewhat beyond the ivory tube, and thus it is to be turned on a proper machine, till the thickness of the ivory is exactly $\frac{1}{2}$ of a line, except at the two extremities. At the bottom *b*, the tube ends in a point; and at the top *aa* it must for about two lines be left a little thicker, to enable it to bear the pressure of another piece put into it. Thus the thin or hygrometrical part of the tube will be reduced to $2\frac{1}{2}$ French inches, including the concavity of the bottom. Before this piece is used, it must be put into water, so that the external part alone may be wetted by it; and here it is to remain till the water penetrates to the inside, and appears in the form of dew, which will happen in a few hours. The reason of this is, that the ivory tube remains somewhat larger ever after it is wetted the first time.

For this hygrometer, a glass tube must be provided about 14 inches long, the lower end of which is shewn in *ddcc*. Its internal diameter is about $\frac{1}{4}$ of a line.

If now the ivory tube is exactly filled with mercury, and the glass one affixed to it, as the capacity of the former decreases by being dried, the mercury will be forced up into the glass one.

The piece *ffgg* is intended to join the ivory with the glass tube. It is of brass, shaped as in the figure. A cylindrical hole is bored through it, which holds the glass tube as tight as possible without danger of breaking it; and its lower part is to enter with some degree of difficulty into the ivory pipe. To hinder that part of the tube which incloses the brass piece from being affected by the variations of the moisture, it is covered with a brass vessel represented in *hhii*. The pieces must be united together with gum-lac or mastic.

The introduction of the mercury is the next operation. For this purpose, a slip of paper three inches wide is first to be rolled over the glass tube, and tied fast to the extremity nearest the ivory pipe. A horse-hair is then to be introduced to the tube, long enough to enter the ivory pipe by an inch, and to reach three or four inches beyond the extremity of the glass one. The paper which has been shaped round the tube must now be raised, and used as a funnel to pour the mercury into the instrument, which is held upright. The purest quicksilver is to be used for this purpose, and it will therefore be proper to use that revived from cinabar. It easily runs into the tube; and the air escapes by means of the horse hair, assisted with some gentle shakes. Fresh mercury must from time to time be supplied, to prevent the mercurial tube from being totally emptied; in which case, the mercurial pellicle which always forms by the contact of the air would run in along with it.

Some air-bubbles generally remain in the tube; they may be seen through the ivory pipe, which is thin enough to have some transparency. These being collected together by shaking, must be brought to the top of the tube, and expelled by means of the horse-hair. To facilitate this operation, some part of the mercury must be taken out of the tube, in order that the air may be less obstructed in getting out, and the horse-hair have a freer motion to assist it. Air, however, cannot be entirely driven out in this manner. It is the weight of the mercury with which the tube is for that reason to be filled, which in time completes its expulsion, by making it pass through the pores of the ivory. To hasten this, the hygrometers are put into a proper box. This is fixed nearly in a vertical direction to the saddle of a horse, which is set at trotting for a few hours. The shakes sometimes divide the column of mercury in the glass tube, but it is easily re-united with the horse-hair. When, upon shaking the hygrometer vertically, no small tremulous motion is any longer perceived in the upper part of the column, one may be sure that all the air is gone out.

The scale of this hygrometer may be adjusted, as soon as the air is gone out, in the following manner. The instrument is to be suspended in a vessel of water cooled with ice, fresh quantities of which are to be added as the former melts. Here it is to remain till it has sunk as low as it will sink by the enlargement of the capacity of the ivory tube, owing to the moisture it has imbibed. This usually happens in seven or eight hours, and is to be carefully noted. In two or

Hygrome-
ter.

three hours the mercury begins to ascend, because the moisture passes into the cavity, and forces it up. The lowest station of the mercury is then to be marked 0; and for the more accurate marking the degrees on the scale, M. De Luc always chose to have his hygrometrical tube made of one which had formerly belonged to a thermometer. The reason of this is, that in the thermometer the expansion of the mercury by heat had been already determined. The distance between the thermometrical points of melting ice and boiling water at 27 French inches of the barometer was found to be 1937 parts. The bulb of this preparatory thermometer was broke in a basin, in order to receive carefully all the mercury that it contained. This being weighed in nice scales amounted to 1428 grains. The hygrometer contained 460 grains of the same mercury. Now it is plain, that the extent of the degrees on the hygrometer, ought to be to that of the degrees on the preparatory thermometer as the different weights of the mercury contained in each; consequently 1428 : 460 :: 1937 : 624 nearly; and therefore the corresponding intervals ought to follow the same proportion; and thus the length of a scale was obtained, which might be divided into as many parts as he pleased.

Fig. 7. is a representation of De Luc's hygrometer when fully constructed. In elegance it far exceeds Smeaton's or any other, and probably also in accuracy; for by means of a small thermometer fixed on the board along with it, the expansion of the mercury by heat may be known with great accuracy, and of consequence how much of the height of the mercury in the hygrometer is owing to that cause, and how much to the mere moisture of the atmosphere.

3. On the third principle, namely, the alteration of the weight of certain substances by their attracting the moisture of the air, few attempts have been made, nor do they seem to have been attended with much success. Sponges dipped in a solution of alkaline salts, and some kinds of paper, have been tried. These are suspended to one end of a very accurate balance, and counterpoised by weights at the other, and shew the degrees of moisture or dryness by the ascent or descent of one of the ends. But, besides that such kinds of hygrometers are destitute of any fixed point from whence to begin their scale, they have another inconvenience (from which indeed Smeaton's is not free, and which has been found to render it erroneous), namely, that all saline substances are destroyed by long continued exposure to the air in very small quantities, and therefore can only imbibe the moisture for a certain time. Oil of vitriol hath therefore been recommended in preference to the alkaline or neutral salts. See CHEMISTRY, n° 105; and, indeed, for such as do not chuse to be at the trouble of constructing a hygrometer on the principles of Mr Smeaton or De Luc, this will probably be found the most easy and accurate. Fig. 8. represents an hygrometer of this kind. A is a small glass cup containing a small quantity of oil of vitriol, B an index counterpoising it, and C the scale; where it is plain, that as the oil of vitriol attracts the moisture of the air the scale will descend, which will raise the index, and *vice versa*. This liquid is exceedingly sensible of the increase or decrease of moisture. A single grain, after its full increase, has varied its

equilibrium so sensibly, that the tongue of a balance, only an inch and a half long, has described an arch one third of an inch in compass, (which arch would have been almost three inches if the tongue had been one foot), even with so small a quantity of liquor; consequently, if more liquor, expanded under a large surface, were used, a pair of scales might afford as nice an hygrometer as any kind yet invented.—A great inconvenience, however, is, that as the air must have full access to the liquid, it is impossible to keep out the dust, which, by continually adding its weight, must render the hygrometer false: add to this, that even oil of vitriol itself is by time destroyed, and changes its nature, if a small quantity of it is continually exposed to the air. So that of all the inventions that have hitherto appeared, De Luc's alone seems capable of being brought to the requisite perfection.

HYGROSCOPE. The same with HYGROMETER.

HYLA (anc. geog.), a river of Myfia Minor, famous for Hylas the favourite boy of Hercules, who was carried down the stream and drowned. It is said to run by Prusa; whence it seems to be the same with the *Rhyndacus*, which runs north-west into the Piontius.

HYLAS, in fabulous history, son of Theodamus, was ravished by the nymphs of a fountain as he was taking out some water for Hercules by whom he was beloved.

HYMEN, or HYMENÆUS, a fabulous divinity, the son of Bacchus and Venus Urania, was supposed by the ancients to preside over marriages; and accordingly was invoked in epithalamiums, and other matrimonial ceremonies, under the formula, *Hymen, o Hymenæe!*

The poets generally crown this deity with a chaplet of roses; and represent him, as it were, dissolved and enraptured with pleasures; dressed in a yellow robe, and shoes of the same colour; with a torch in his hand.—Catullus, in one of his epigrams, addresses him thus:

*Ginge tempora floribus,
Suaveolentis amaraci.*

It was for this reason, that the new-married couple bore garlands of flowers on the wedding-day: which custom also obtained among the Hebrews; and even among Christians, during the first ages of the church, as appears from Tertullian, *De corona militari*, where he says, *Coronant & nuptia sponsos*.—S. Chrysostom likewise mentions these crowns of flowers; and to this day the Greeks call marriage *σπονδαί*, in respect of this crown or garland.

HYMEN, in anatomy, a membrane in general; but by it is usually understood the membrane which appears in the form of a crescent, and is situated at the entrance of the vagina. When this membrane is ruptured, it is shrivelled up, and forms the carunculae myrtiliformes. It naturally shrinks with years, and often disappears before the age of 20, so can be no proof of virginity.

In some infants this membrane so closes up the urethra, that the urine cannot be voided: in others, the urine passes, but when the menses flow, they cannot be discharged, because of the imperforated hymen.

When the mark of perforation cannot be seen, the cure is thought to be impracticable; but when the puncture

Hygroscop
Hymen.

puncture of a lancet could not produce the desired effect, a trochar and canula hath succeeded, though a passage of four inches was perforated before the end was obtained.—In the memoirs of the Royal Academy of Sciences for 1756, we have an account of a conception without any perforation of the hymen.

HYMENÆAL, something belonging to marriage; so called from **HYMEN**. See **POSTRY**, n° 157.

HYMN, a song or ode in honour of God; or a poem, proper to be sung, composed in honour of some deity. See **SONG**, and **ODE**.—The word is Greek, *ᾠδή*, *hymn*, formed of the verb *ᾠδω*, *celebro*, “I celebrate.”—Isidore, on this word, remarks, that *hymn* is properly a song of joy, full of the praises of God: by which, according to him, it is distinguished from *threnia*, which is a mourning song, full of lamentation.

St Hilary, bishop of Poitiers, is said to have been the first that composed hymns to be sung in churches, and was followed by St Ambrose. Most of those in the Roman Breviary were composed by Prudentius. They have been translated into French verse by Messieurs de Port Royal.—In the Greek Liturgy there are four kinds of hymns; but the word is not taken in the sense of a praise offered in verse, but simply of a laud or praise. The angelic hymn, or *Gloria in excelsis*, makes the first kind; the *trifagion* the second; the *Cherubic hymn*, the third; and the hymn of *victory and triumph* called *ἐκτάσις*, the last.

The hymns or odes of the ancients, generally consisted of three stanzas or couplets; the first called *Strophe*, the second *antistrophe*, and the last *epode*.

HYMMETTUS (anc. geog.), a mountain of Attica near Athens, famous for its marble quarries, and for its excellent honey. *Hymettius* the epithet. Pliny says that the orator Crassus was the first who had marble columns from this place.

HYOIDES, in anatomy, a bone placed at the root of the tongue. See **ANATOMY**, n° 27.

HYOSCYAMUS, **HEMBANE**; a genus of the monogynia order, belonging to the pentandria class of plants. There are several species, one of which, viz. the niger, or common henbane, is a native of Britain. It grows on road-sides, and among rubbish. It is a biennial plant, with long fleshy roots which strike deep into the ground, sending out several large soft leaves, deeply slashed on their edges; the following spring the stalks come up, which are about two feet high, garnished with flowers standing on one side in a double row, sitting close to the stalks alternately. They are of a dark purplish colour, with a black bottom; and are succeeded by roundish capsules which open with a lid at the top, and have two cells filled with small irregular seeds.—The seeds, leaves, and roots of this plant, as well as of all other species of this genus, are poisonous: and many well attested instances of their bad effects are recorded; madness, convulsions, and death, being the common consequence. In a smaller dose, they occasion giddiness and stupor. It is said that the leaves scattered about a house will drive away mice.—The juice of the plant evaporated to an extract, is ordered by the Edinburgh college in some cases as a narcotic, in which respect undoubtedly it may be a powerful medicine if properly managed. The dose is from half a scruple to half a dram.—Goats are not fond of the plant; horses, cows, sheep, and swine,

refuse it.

HYO-THYROIDES, in anatomy, one of the muscles belonging to the os hyoides. See **ANATOMY**, *Table of the Muscles*.

HYPALLAGE, among grammarians, a species of hyperbaton, consisting in a mutual permutation of one case for another. Thus Virgil says, *Dare clasibus austros*, for *dare classes austris*; and again, *Necdum illis labra admoxi*, for *necdum illa labris admoxi*.

HYPANTE, or **HYPERPANTE**, a name given by the Greeks to the feast of the presentation of Jesus in the temple.—This word, which signifies *lowly* or *humble meeting*, was given to this feast from the meeting of old Simon and Anna the prophetess in the temple when Jesus was brought thither.

HYPATIA, a learned and beautiful lady of antiquity, the daughter of Theon a celebrated philosopher and mathematician, and president of the famous Alexandrian school, was born at Alexandria about the end of the fourth century. Her father, encouraged by her extraordinary genius, had her educated not only in all the ordinary qualifications of her sex, but caused her likewise to be instructed in the most abstruse sciences. She made such great progress in philosophy, geometry, astronomy, and the mathematics, that she passed for the most learned person of her time. At length she was thought worthy to succeed her father in that distinguished and important employment, the government of the school of Alexandria; and to teach out of that chair where Ammonius, Hierocles, and many other great men, had taught before; and this at a time too when men of great learning abounded both at Alexandria and in many other parts of the Roman empire. Her fame was so extensive, and her worth so universally acknowledged, that we cannot wonder if she had a crowded auditory. “She explained to her hearers, (says Socrates), the several sciences that go under the general name of philosophy; for which reason there was a confluence to her, from all parts, of those who made philosophy their delight and study.” One cannot represent to himself without pleasure, the flower of all the youth of Europe, Asia, and Africa, sitting at the feet of a very beautiful lady, (for such we are assured Hypatia was), all greedily swallowing instruction from her mouth, and many of them, doubtless, love from her eyes; though we are not sure that she ever listened to any solicitations, since Suidas, who talks of her marriage with Isidorus, yet relates at the same time that she died a maid.

Her scholars were as eminent as they were numerous; one of whom was the celebrated Synesius, who was afterwards bishop of Ptolemais. This ancient Christian Platonist every where bears the strongest, as well as the most grateful testimony of the virtue of his tutors; and never mentions her without the most profound respect, and sometimes in terms of affection coming little short of adoration. But it was not Synesius only, and the disciples of the Alexandrian school, who admired Hypatia for her virtue and learning: never was woman more caressed by the public, and yet never woman had a more unspotted character. She was held as an oracle for her wisdom, which made her consulted by the magistrates in all important cases; and this frequently drew her among the greatest concourse of men, without the least censure of her manners.

Hypatia
||
Hyperba-
ton.

In a word, when Nicephorus intended to pass the highest compliment on the princess Eudocia, he thought he could not do it better than by calling her another *Hypatia*.

While Hypatia thus reigned the brightest ornament of Alexandria, Orestes was governor of the same place for the emperor Theodosius, and Cyril was bishop or patriarch. Orestes having had a liberal education, could not but admire Hypatia; and as a wife governor frequently consulted her. This, together with an aversion which Cyril had against Orestes, proved fatal to the lady. Above 500 monks assembling, attacked the governor one day, and would have killed him, had he not been rescued by the townsmen; and the respect which Orestes had for Hypatia causing her to be traduced among the Christian multitude, they dragged her from her chair, tore her to pieces, and burned her limbs. Cyril is not clear from a suspicion of fomenting this tragedy. Cave indeed endeavours to remove the imputation of such an horrid action from the patriarch; and lays it upon the Alexandrian mob in general, whom he calls *levisimum hominum genus*, "a very trifling inconstant people." But though Cyril should be allowed neither to have been the perpetrator, nor even the contriver of it, yet it is much to be suspected that he did not discountenance it in the manner he ought to have done; which suspicion must needs be greatly confirmed by reflecting, that he was so far from blaming the outrage committed by the monks upon Orestes, that he afterwards received the dead body of Ammonius, one of the most forward in that outrage, who had grievously wounded the governor, and who was justly punished with death. Upon this riotous ruffian Cyril made a panegyric in the church where he was laid, in which he extolled his courage and constancy, as one that had contended for the truth; and changing his name to *Thaumastus*, or the "Admirable," ordered him to be considered as a martyr. "However, (continues Socrates), the wisest part of Christians did not approve the zeal which Cyril shewed on this man's behalf, being convinced that Ammonius had justly suffered for his desperate attempt."

HYPECOUM, *WILD CUMIN*; a genus of the dymnia order, belonging to the tetrandria class of plants. There are four species, all of them low herbaceous plants with yellow flowers. The juice of these plants is of a yellow colour, resembling that of celandine, and is affirmed by some eminent physicians to be as narcotic as opium. From the nectarium of the blossom the bees collect great quantities of honey. All the species are easily propagated by seeds.

HYPER, a Greek preposition frequently used in composition, where it denotes excess; its literal signification being *above*, or *beyond*.

HYPERBATON, in grammar, a figurative construction inverting the natural and proper order of words and sentences. The several species of the hyperbaton are, the anastrophe, the hysteron-proteron, the hypallage, synchysis, tmesis, parenthesis, and the hyperbaton strictly so called. See *ANASTROPHE*, &c.

HYPERBATON, strictly so called, is a long retention of the verb which completes the sentence, as in the following example from Virgil.

Interea Reges: ingenti mole Latinus

*Quadrifugo vehitur curru, cui tempora circum
Aurati bis sex radii fulgentia cingunt,
Solis avi specimen: bigis it Turnus in albis
Bino manu lato crispans hostilia ferro:
Hinc Pater Æneas, Romanæ stirpis origo,
Sideræo flagrans clypeo et celestibus armis;
Et juxta Ascanius, magnæ spes altera Romæ:
Procedunt Castris.*

HYPERBOLA, a curve formed by cutting a cone in a direction parallel to its axis. See *CONIC SECTIONS*.

HYPERBOLE, in rhetoric, a figure, whereby the truth and reality of things are excellently either enlarged or diminished. See *ORATORY*, n° 58.

An object uncommon with respect to size, either very great of its kind or very little, strikes us with surprise; and this emotion forces upon the mind a momentary conviction that the object is greater or less than it is in reality: the same effect, precisely, attends figurative grandeur or littleness; and hence the hyperbole, which expresses this momentary conviction. A writer, taking advantage of this natural delusion, enriches his description greatly by the hyperbole: and the reader, even in his coolest moments, relishes this figure, being sensible that it is the operation of nature upon a warm fancy.

It cannot have escaped observation, that a writer is generally more successful in magnifying by a hyperbole than in diminishing. The reason is, that a minute object contracts the mind, and fetters its powers of imagination; but that the mind, dilated and inflamed with a grand object, moulds objects for its gratification with great facility. Longinus, with respect to a diminishing hyperbole, cites the following ludicrous thought from a comic poet: "He was owner of a bit of ground not larger than a Lacedæmonian letter." But, for the reason now given, the hyperbole has by far the greater force in magnifying objects; of which take the following examples:

For all the land which thou seest, to thee will I give it, and to thy seed for ever. And I will make thy seed as the dust of the earth: so that if a man can number the dust of the earth, then shall thy seed also be numbered. *Gen. xiii. 15. 16.*

*Illæ vel intactæ segetibus per summa volaret
Gramina: nec teneras cursu læsisset aristas.*

Æneid. vii. 808.

— — — — — Atque imo barathri ter gurgite vastos
Sorbet in abruptum fluctus, rursusque sub auras
Erigit alternos, et sidera verberat unda.

Æneid. iii. 421.

— — — — — Horrificis juxta tonat Ætna ruinis,
Interdumque atram prorumpit ad æthera nubem,
Turbine fumantem piceo et candente favilla:
Attollitque globos flammæ, et sidera lambit.

Æneid. iii. 571.

Speaking of Polyphemus,

— — — — — Ipse arduus, atque pulsata
Sidera.

Æneid. iii. 619.

— — — — — When he speaks,
The air, a charter'd libertine, is still.

Henry V. act 1. sc. 1.

Now shield with shield, with helmet helmet clos'd,
To armour armour, lance to lance oppos'd,
Host against host with shadowy squadrons drew,
The founding darts in iron tempests flew,
Victors and vanquish'd join promiscuous cries,
And shilling shouts and dying groans arise;
With streaming blood the slippery fields are dy'd,
And slaughter'd heroes swell the dreadful tide.

Iliad iv. 508.

Quintilian is sensible that this figure is natural: "For, (says he), not contented with truth, we naturally incline to augment or diminish beyond it; and for that reason the hyperbole is familiar even among the vulgar and illiterate:" and he adds, very justly, "That the hyperbole is then proper, when the object of itself exceeds the common measure." From these premises, one would not expect the following inference, the only reason he can find for justifying this figure of speech, "Conceditur enim amplius dicere, quia dici quantum est, non potest: meliusque ultra quam citra fiat oratio." (We are indulged to say more than enough, because we cannot say enough; and it is better to be above than under.) In the name of wonder, why this slight and childish reasoning, when immediately before he had observed, that the hyperbole is founded on human nature? We could not resist this personal stroke of criticism; intended not against our author, for no human creature is exempt from error; but against the blind veneration that is paid to the ancient classic writers, without distinguishing their blemishes from their beauties.

Having examined the nature of this figure, and the principle on which it is erected; let us proceed to the rules by which it ought to be governed. And, in the first place, it is a capital fault, to introduce an hyperbole in the description of an ordinary object or event; for in such a case, it is altogether unnatural, being destitute of surprise, its only foundation. Take the following instance, where the subject is extremely familiar, viz. swimming to gain the shore after a shipwreck,

I saw him beat the surges under him,
And ride upon their backs: he trod the water;
Whose enmity he flung aside, and breast'd
The surge most swollen that met him: his bold head
'Bove the contentuous waves he kept, and oar'd
Himself with his good arms, in lusty strokes
To th' shore, that o'er his wave-born basis bow'd,
As stooping to relieve him. *Tempest*, act 2. sc. 1.

In the next place it may be gathered from what is said, that an hyperbole can never suit the tone of any dispiriting passion: sorrow in particular will never prompt such a figure, and for that reason the following hyperboles must be condemned as unnatural:

K. Rich. Aumerle, thou weep'st, my tender-hearted cousin!

We'll make foul weather with despid tears;
Our signs, and they, shall lodge the summer-corn,
And make a dearth in this revolving land.

Richard II. act 3. sc. 6.

Draw them to Tyber's bank, and weep your tears
Into the channel, till the lowest stream

Do kiss the most exalted shores of all.

Julius Cæsar, act 1. sc. 1.

Thirdly, A writer, if he wish to succeed, ought always to have the reader in his eye: he ought, in particular, never to venture a bold thought or expression, till the reader be warmed and prepared. For this reason, an hyperbole in the beginning of a work can never be in its place. Example:

Jam pauca aratro jugera regie

Moles relinquunt. *Horat. Carm. lib. 2. ode 15.*

In the fourth place, The nicest point of all, is to ascertain the natural limits of an hyperbole, beyond which being overstrained it has a bad effect. Longinus, (chap. iii.) with great propriety of thought, enters a caveat against an hyperbole of this kind: he compares it to a bow-string, which relaxes by overstraining, and produceth an effect directly opposite to what is intended. To ascertain any precise boundary, would be difficult, if not impracticable. We shall therefore only give a specimen of what may be reckoned overstrained hyperboles. No fault is more common among writers of inferior rank; and instances are found even among those of the finest taste; witness the following hyperbole, too bold even for an Hotspur.

Hotspur, talking of Mortimer:

In single opposition hand to hand,

He did confound the best part of an hour

In changing hardiment with great Glendower.

Three times they breath'd, and three times did they drink,

Upon agreement, of swift Severn's flood;

Who then affrighted with their bloody looks,

Ran fearfully among the trembling reeds,

And hid his crisp'd head in the hollow bank,

Blood-stained with these valiant combatants.

First Part Henry IV. act 1. sc. 4.

Speaking of Henry V.

England ne'er had a King until his time.

Virtue he had, deserving to command:

His brandish'd sword did blind men with its beams:

His arms spread wider than a dragon's wings:

His sparkling eyes, replete with awful fire,

More dazzled, and drove back his enemies,

Than mid-day sun fierce bent against their faces.

What should I say? his deeds exceed all speech:

He never lifted up his hand, but conquer'd.

First Part Henry VI. act 1. sc. 1.

Lastly, An hyperbole, after it is introduced with all advantages, ought to be comprehended within the fewest words possible: as it cannot be relished but in the hurry and swelling of the mind, a leisurely view dissolves the charm, and discovers the description to be extravagant at least, and perhaps also ridiculous. This fault is palpable in a sonnet which passeth for one of the most complete in the French language: Phillis, in a long and florid description, is made as far to outshine the sun as he outshines the stars:

Le silence regnoit sur la terre et sur l'onde,
L'air devenoit ferein et l'Olimp vermeil,

Hyperbo-
rean
||
Hyperia.

Et l'amoureux Zephir affranchi du foyel,
Reffusitoit les fleurs d'une haleine seconde.

L'Aurore deployoit l'or de sa tresse blonde,
Eet semoit de rubis le chemin du soleil ;
Enfin ce Dieu venoit au plus grand appareil
Qu'il soit jamais venu pour éclairer le monde :

Quand la jeune Philis au visage riant,
Sortant de son palais plus clair que l'orient,
Fit voir une lumiere et plus vive et plus belle.

Sacre flambeau du jour, n'en soiez point jaloux,
Vous parutes alors aussi peu devant elle,
Que les feux de la nuit avoient fait devant vous.

Malleville.

There is in Chaucer a thought expressed in a single line, which sets a young beauty in a more advantageous light than the whole of this much laboured poem :

Up rose the sun, and up rose Emelie.

HYPERBOREAN, in the ancient geography. The ancients denominated those people and places *Hyperborean*, which were to the northward of the Scythians. They had but very little acquaintance with these *Hyperborean* regions ; and all they tell us of them is very precarious, much of it false. Diodorus Siculus says, the *Hyperboreans* were thus called by reason they dwelt beyond the wind *Boreas* ; *υπερ* signifying " above, or beyond," and *βορρας*, *Boreas*, the " north wind." This etymology is very natural and plausible ; notwithstanding all that Rudbeck has said against it, who would have the word to be Gothic, and to signify *nobility*. Herodotus doubts, whether or no there were any such nations as the *Hyperborean*. Strabo, who professes that he believes there are, does not take *hyperborean* to signify *beyond Boreas* or the north, as Herodotus understood it : the preposition *υπερ*, in this case, he supposes only to help to form a superlative ; so that *hyperborean*, on his principle, means no more than *most northern* : by which it appears the ancients scarce knew themselves what the name meant.

HYPERCATALECTIC, in the Greek and Latin poetry is applied to a verse that has one or two syllables too much, or beyond the regular and just measure ; as,

Muse sorores sunt Minervæ :

Alfo,

Muse sorores Palladis lugent.

HYPERCRITIC, an over-rigid censor, or critic : one who will let nothing pass, but animadvert severely on the slightest fault. See *CRITICISM*. The word is compounded of *υπερ*, *super*, " over, above, beyond," and *κριτικος*, of *κρισις*, *judex*, of *κρινω*, *judico*, " I judge."

HYPERDULIA, in the Romish theology, is the worship rendered to the holy virgin. The word is Greek, *υπερδουλια*, composed of *υπερ*, *above*, and *δουλια*, *worship, service*. The worship offered to saints is called *dulia* ; and that to the mother of God, *hyperdulia*, as being superior to the former.

HYPERIA (anc. geog.), the seat of the Phæacians near the Cyclops, (Homer) : some commentators

take it to be Camarina in Sicily ; but, according to others, supposed to be an adjoining island, which they take to be Melita, lying in sight of Sicily. And this seems to be confirmed by Apollonius Rhodius. Whence the Phæacians afterwards removed to Corcyra, called *Scheria*, *Phæacia*, and *Maëris* ; having been expelled by the Phœnicians, who settled in Melita for commerce, and for commodious harbours, before the war of Troy. (Diodorus Siculus.)

HYPERICUM, St JOHN'S WORT ; a genus of the polyandria order, belonging to the polyadelphia class of plants.

Species. Of this genus there are 29 species, most of them hardy deciduous shrubs, and under-shrubby plants, adorned with oblong and oval simple foliage, and pentapetalous yellow flowers in clusters. The most remarkable are, 1. The *hircinum*, or Stinking St John's-wort. This rises three or four feet high, with several shrubby two-edged stalks from the root, branching by pairs opposite at every joint ; oblong, oval, close-fitting opposite leaves ; and, at the ends of all the young shoots, clusters of yellow flowers. Of this there are three varieties ; one with strong stalks, six or eight feet high, broad leaves, and large flowers ; the other with strong stalks, broad leaves, and without any disagreeable odour ; the third hath variegated leaves. All these varieties are shrubby ; and flower in June and July in such numerous clusters, that the shrubs appear covered with them ; and produce abundance of seed in autumn. 2. The *canariensis* hath shrubby stalks, dividing and branching six or seven feet high ; oblong, close-fitting leaves by pairs ; and, at the ends of the branches, clusters of yellow flowers appearing in June and July. 3. The *ascyron*, or dwarf American St John's-wort, hath spreading roots, sending up numerous, slender, square stalks, a foot long ; oval, spear-shaped, close-fitting, smooth leaves by pairs opposite ; and, at the ends of the stalks, large yellow flowers. 4. The *androsemum*, commonly called *tuslan*, or *park-leaves*, hath an upright under-shrubby stalk, two feet high, branching by pairs opposite ; and at the ends of the stalks, clusters of small yellow flowers appearing in July and August, and succeeded by roundish berry-like black capsules. This grows naturally in many parts of Britain. 5. The *balearicum*, or wart-leaved St John's-wort, is a native of Majorca ; and hath a shrubby stalk, branching two feet high, with reddish scarified branches, small oval leaves warted underneath, and large yellow flowers appearing great part of the year. 6. The *monogynum*, or one-styled *China hypericum*, hath a shrubby purplish stalk, about two feet high ; oblong, smooth, stiff, close-fitting leaves, of a shining green above, and white underneath ; clusters of small yellow flowers, with coloured cups, and only one style, flowering the greatest part of the year. 7. The *lasianthus*, or Surinam St John's-wort, hath shrubby stalks, branching a yard high ; spear-shaped serrated leaves ; hoary underneath, and yellow flowers from the axillæ of the stalks. It is a native of Surinam and Carolina.

Culture. The four first species are hardy, and will grow in any soil or situation ; the three last must be potted, in order to have shelter in the green-house in winter. The two first species propagate very fast by suckers, which are every year sent up plentifully from the

Hyperic

the root; and in autumn or spring may be readily slipped off from the old plants with roots to each, or the whole plant may be taken up and divided into as many parts as there are suckers and slips with roots, planting the strongest where they are to remain, and the weakest in nursery-rows, where they are to remain a year in order to acquire strength. They may also be propagated by seeds sown in autumn, in a bed of common earth, in drills an inch deep. The other two hardy sorts are also propagated by slipping the roots in autumn, or early in the spring; and may likewise be raised in great plenty from seeds. The three other species are propagated by layers and cuttings, planted in pots, and plunged in a hot-bed.

Properties. The tuffan hath long held a place in the medicinal catalogues; but its uses are very much undetermined. The leaves given in substance are said to destroy worms. By distillation they yield an essential oil. The flowers tinge spirits and oils of a fine purple colour. Cows, goats, and sheep, eat the plant; horses and swine refuse it. The dried plant boiled in water with alum, dyes yarn of a yellow colour; and the Swedes give a fine purple tinge to their spirits with the flowers.

HYPERIDES, an orator of Greece, was the disciple of Plato and Isocrates, and governed the republic of Athens. He defended with great zeal and courage the liberties of Greece; but was put to death by Antipater's order, 322 B. C. He composed many orations, of which only one now remains. He was one of the ten celebrated Greek orators.

HYPERMNESTRA, in fabulous history, one of the 50 daughters of Danaus king of Argos. She alone refused to obey the cruel order Danaus had given to all his daughters, to murder their husbands the first night of their marriage; and therefore saved the life of Lynceus, after she had made him promise not to violate her virginity. Danaus, enraged at her disobedience, confined her closely in prison, whence Lynceus delivered her some time after.

HYPERSARCOSIS, in medicine and surgery, an excess of flesh, or rather a fleshy excrescence, such as those generally arising upon the lips of wounds, &c.

HYPHEN, an accent or character in grammar, implying that two words are to be joined, or connected into one compound word, and marked thus -; as *pre-estallish'ded, five-leaved, &c.* Hyphens also serve to connect the syllables of such words as are divided by the end of the line.

HYPNOTIC, in the materia medica, such medicines as any way produce sleep, whether called *narcotics, hypnotics, opiates, or soporifics.*

HYPNOTICUS SERPENS, the *Sleep-snake*, in zoology, the name of an East-Indian species of serpent, called by the Ceylonese *nintipolong*, a word importing the same sense. It is of a deep blackish brown, variegated with spots of white, and is a very fatal kind in its poison; its bite always bringing on a sleep which ends in death.

HYPNUM, FEATHER-MOSS; a genus of the order of mosses, belonging to the cryptogamia class of plants. There are 46 species, all of them natives of Great Britain; none of them, however, have any remarkable property, except the proliiferum and parietinum. The

first is of a very singular structure, one shoot growing out from the centre of another; the veil is yellow and shining; the lid with a kind of long bill; the leaves not shining; sometimes of a yellowish, and sometimes of a deep green. This moss covers the surface of the earth in the thickest shades, through which the sun never shines, and where no other plant can grow. The second hath shoots nearly flat and winged, undivided for a considerable length, and the leaves shining; but the old shoots do not branch into new ones as in the preceding species. It grows in woods and shady places; and, as well as the former, is used for filling up the chinks in wooden houses.

HYPOBOLE. See ORATORY, n° 81.

HYPOCAUSTUM, among the Greeks and Romans, a subterraneous place, where was a furnace to heat the baths. The word is Greek, formed of the preposition *υπο*, under; and the verb *καίω*, to burn.—Another sort of hypocaustum was a kind of kiln to heat their winter-parlours. The remains of a Roman hypocaustum, or sweating-room, were discovered under ground at Lincoln in 1739. We have an account of these remains in the Philosophical Transactions, n° 461. § 29.—Among the moderns, the hypocaustum is that place where the fire is kept, which warms a stove or hot-house.

HYPOCHERIS, HAWK'S-EYE; a genus of the polygamia aequalis order, belonging to the syngenesia class of plants. There are four species; none of which have any remarkable property, except the maculata, or spotted hawk's-eye. It is a native of Britain, and grows on high grounds. The leaves are oblong, egg-shaped, and toothed; the stem almost naked, generally with a single branch; the blossoms yellow, opening at six in the morning, and closing at four in the afternoon. The leaves are boiled and eaten like cabbage. Horses are fond of this plant when green, but not when dry. Cows, goats, and swine eat it; sheep are not fond of it.

HYPOCHONDRIA, in anatomy, a space on each side the epigastric region, or upper part of the abdomen. See ANATOMY, n° 349, d.

HYPOCHONDRIAC PASSION, a disease in men, similar to the hysteric affection in women. See (the *Index* subjoined to) MEDICINE.

HYPOCISTIS, in the materia medica, an inspissated juice obtained from the cistle asarum, much resembling the true Egyptian acacia. They gather the fruit while unripe, and express the juice, which they reevaporate over a very gentle fire, to the consistence of an extract, and then form into cakes, and expose them to the sun to dry. It is an astringent of considerable power; is good against diarrhoeas and hæmorrhages of all kinds; and may be used in redellent gargarisms in the manner of the true acacia; but it is very rarely met with genuine in our shops, the German acacia being usually sold under its name.

HYPOGASTRIC, an appellation given to the intestinal branch of the iliac artery.

HYPOGASTRIUM, in anatomy, the middle part of the lower region of the belly. See ANATOMY, n° 349, d.

HYPOPYON, in medicine, a collection of purulent matter under the corner of the eye.

Hypothec
Hypothes.

HYPOTHEC, in law, a right of security established by law to creditors upon the goods and effects of their debtors, for the payment of certain debts.

HYPOTHENUSE, in geometry, the longest side of a right-angled triangle, or that which subtends the right-angle.

HYPOTASIS, a Greek term, literally signifying *substance*, or *substance*; used in theology for *person*.—The word is Greek, *υποταξις*; compounded of *υπο*, *sub*, “under;” and *ταξις*, *sto, existo*, “I stand, I exist;” q. d. *sub-sistentia*. Thus we hold, that there is but one nature or essence in God, but three *hypostases* or persons.

The term *hypostasis* is of a very ancient standing in the church. St Cyril repeats it several times, as also the phrase *union according to hypostasis*. The first time it occurs is in a letter from that father to Nestorius, where he uses it instead of *συνουσιαστων*, the word we commonly render *person*, which did not seem expressive enough. “The philosophers (says St Cyril) have allowed three *hypostases*: They have extended the Divinity to three *hypostases*: They have even sometimes used the word *trinity*: And nothing was wanting but to have admitted the consubstantiality of the three *hypostases*, to shew the unity of the divine nature, exclusive of all triplicity in respect of distinction of nature, and not to hold it necessary to conceive any respective inferiority of *hypostases*.”

This term occasioned great dissensions in the ancient church; first among the Greeks, and afterwards also among the Latins. In the council of Nice, *hypostasis* was defined to denote the same with *essence* or *substance*; so that it was hereby to say that Jesus Christ was of a different *hypostasis* from the Father; but custom altered its meaning. In the necessity they were under of expressing themselves strongly against the Sabellians, the Greeks made choice of the word *hypostasis*, and the Latins of *persona*; which change proved the occasion of endless disagreement. The phrase *τρεῖς υποστασεις*, used by the Greeks, scandalized the Latins, whose usual way of rendering *υποστασις* in their language was by *substantia*. The barrenness of the Latin tongue in theological phrases, allowed them but one word for the two Greek ones, *verba* and *υποστασις*; and thus disabled them from distinguishing *essence* from *hypostasis*. For which reason they chose rather to use the term *tres personae*, and *tres hypostases*.—An end was put to logomachias, in a synod held at Alexandria about the year 362, at which St Athanasius assisted; from which time the Latins made no great scruple of saying *tres hypostases*, nor the Greeks of *three persons*.

HYPOTHESIS, in general, denotes something supposed to be true, or taken for granted, in order to prove or illustrate a point in question. Hypotheses, however elegant or artful, ought to be first proved by repeated observations and constant experience, before they are received as truths.

HYPOTIPOSIS. See ORATORY, n° 91.

HYRCANIA (anc. geog.), a country of the farther Asia, lying to the south-east of the *Mare Hyrcanum* or *Caspium*; with Media on the west, Parthia on the south, and Margiana on the west. Famous for its tygers, (Virgil); for its vines, figs, and olives, (Strabo).

HYSSOPUS, *hyssop*; a genus of the gymno-

perma order, belonging to the didynamia class of plants. There are three species; but only one of them, viz. the *officinalis*, or common hyssop, is cultivated for use. This hath under-shrubby, low, bushy stalks, growing a foot and a half high; small, spear-shaped, close-fitting, opposite leaves, with several smaller ones rising from the same joint; and all the stalks and branches terminated by erect whorled spikes of flowers, of different colours in the varieties. They are very hardy plants; and may be propagated either by slips or cuttings, or by seeds. The leaves have an aromatic smell, and a warm pungent taste. Besides the general virtues of aromatics, they are particularly recommended in humoral astmas, coughs, and other disorders of the breast and lungs; and are said notably to promote expectoration.

HYSTERIC, or **HYSTERIC PASSION**. See (*Index* subjoined to) **MEDICINE**.

HYSTERON PROTERON, in grammar and rhetoric, a species of the hyperbaton, wherein the proper order of construction is so inverted, that the part of any sentence which should naturally come first is placed last: as in this of Terence, *Valet et vitit, for vivit et valet*; and in the following of Virgil, *Moriatur, & in media arma ruamus*, for *In media arma ruamus, & moriatur*.

HYSTRIX, in zoology, a genus of quadrupeds belonging to the order of glires, the characters of which are these: They have two fore-teeth, obliquely divided both in the upper and under jaw, besides eight grinders; and the body is covered with quills or prickles. There are four species, viz.

1. The *cristata*, or crested porcupine, has four toes on the fore-feet, five toes on the hind-feet, a crested head, a short tail, and the upper lip is divided like that of a hare. The length of the body is about two feet, and the height about two feet and a half. The porcupine is covered with prickles, some of them nine or ten inches long, and about $\frac{1}{2}$ of an inch thick. Like the hedge-hog, he rolls himself up in a globular form, in which position he is proof against the attacks of the most rapacious animals. The prickles are exceedingly sharp, and each of them has five large black and as many white rings, which succeed one another alternately from the root to the point. These quills the animal can erect or let down at pleasure; when irritated, he beats the ground with his hind-feet, erects his quills, shakes his tail, and makes a considerable rattling noise with his quills.

Most authors have asserted that the porcupine, when irritated, darts his quills to a considerable distance against the enemy, and that he will kill very large animals by this means. But M. Buffon, and some other late historians, assure that the animal possesses no such power. M. Buffon frequently irritated the porcupine, but never saw any thing like this darting of his quills. He says indeed, that when the creature was much agitated with passion, some of the quills which adhered but slightly to the skin, would fall off, particularly from the tail; and this circumstance, he imagines, has given rise to the mistake.

The porcupine, though originally a native of Africa and the Indies, can live and multiply in the more temperate climates of Spain and Italy. Pliny, and every other natural historian since the days of Aristotle,

tell

tells us, that the porcupine, like the bear, conceals itself during the winter, and that they bring forth their young in 80 days. But these circumstances remain to this day uncertain. It is remarkable, that although this animal be very common in Italy, no person has ever given us a tolerable history of it. We only know in general, that the porcupine, in a domestic state, is not a fierce or ill-natured animal; that with his fore-teeth, which are strong and sharp, he can cut through a strong board; that he eats bread, fruits, roots, &c.; that he does considerable damage when he gets into a garden; that he grows fat, like most animals, about the end of summer; and that his flesh is not bad food.

2. The *prehensilis*, or *cuandu*, has four toes on the fore-feet, five on the hind-feet, and a long tail. It is considerably less than the former species; being only 17 inches long from the point of the muzzle to the origin of the tail, which is nine inches long; the legs and feet are covered with long brownish hair;

the rest of the body is covered with quills interpersed with long hairs; the quills are about five inches long, and about $\frac{1}{4}$ of an inch in diameter. He feeds upon birds and small animals. He sleeps in the day like the hedge-hog, and searches for his food in the night. He climbs trees, and supports himself by twisting his tail round the branches. He is generally found in the high grounds of America from Brasil to Louisiana, and the southern parts of Canada. His flesh is esteemed very good eating.

3. The *dorsata* has four toes on the fore-feet, five on the hind-feet; and has quills only on the back, which are short, and almost hid among the long hair. He is about two feet long. He is a native of Hudson's-bay. The savages eat his flesh, and make use of his skin as a fur, after taking off the prickles.

4. The *macroura*, has five toes both on the hind and fore-feet; his tail is very long, and the prickles are elevated. He is a native of Africa and the East-Indies.

Hystrix
Jablonski.

I.

I, or *i*, the ninth letter and third vowel of the alphabet, is pronounced by throwing the breath suddenly against the palate, as it comes out of the larynx, with a small hollowing of the tongue, and nearly the same opening of the lips and talk as in pronouncing *a* or *e*. Its sound varies: in some words it is long, as *high*, *mind*, &c.; in others short, as *bid*, *hid*, *fin*, &c.; in others, again, it is pronounced like *y*, as in *collier*, *union*, &c.; and in a few, it sounds like *ee*, as in *machine*, *magazine*, &c. No English word ends in *i*, *e* being either added to it, or else the *i* turned into *y*.

But besides the vowel, there is the *jod* consonant; which, because of its different pronunciation, has likewise a different form, thus *j*, *j*. In English, it has the soft sound of *g*; nor is *j* used, but when *g* soft is required before vowels, where *g* is usually hard: thus we say, *jack*, *jet*, *join*, &c. instead of *gack*, *get*, *goin*, &c. which would be contrary to the genius of the English language.

I, used as a numeral, signifies no more than *one*, and stands for so many units as it is repeated times: thus **I**, one; **II**, two; **III**, three, &c.; and when put before a higher numeral, it subtrahes itself, as **IV**, four; **IX**, nine, &c. But when set after it, so many are added to the higher numeral, as there are **I**'s added: thus **VI** is 5+1, or six; **VII**, 5+2, or seven; **VIII**, 5+3, or eight. The ancient Romans likewise used **IO** for 500, **CIO** for 1000, **IOO** for 5000, **CCIOO** for 10,000, **IOOO** for 50,000, and **CCCCIOO** for 100,000. Farther than this, as Pliny observes, they did not go in their notation; but when necessary, repeated the last number, as **CCCCIOOO**, **CCCCIOOO**, for 200,000; **CCCCIOOO**, **CCCCIOOO**, **CCCCIOOO**, for 300,000; and so on.

The ancients sometimes changed *i* into *u*; as

ducimus for *decimus*; *maximus* for *maximus*, &c. — According to Plato, the vowel *i* is proper to express delicate but humble things, as in this verse in Virgil, which abounds in *i*'s, and is generally admired:

Accipiant inimicum imbrem, rimisque satiscunt.

I, used as an abbreviation, is often substituted for the whole word *Jesurus*, of which it is the first letter.

JABES-GALAAD, or **JABESH-GILEAD**, (anc. geogr.) a city of Judæa, lying beyond the river Jordan, called *Jabifur* and *Jabifsa* by Josephus; the metropolis of Gilead. In Jerome's time, a village on an eminence, six miles from Pella.

JABLONSKI (Daniel Ernest), a learned Polish Protestant divine, born at Dantzick in 1660. He became successively minister of Magdeburg, Lissa, Königsberg, and Berlin; and was at length ecclesiastical counsellor, and president of the academy of sciences at the latter. He took great pains to effect an union between the Lutherans and Calvinists; and wrote some works which are in good esteem, particularly Meditations on the origin of the Scriptures, &c. He died in 1741.

JABLONSKI (Theodore), counsellor of the court of Prussia, and secretary of the royal academy of sciences at Berlin, was also a man of distinguished merit. He loved the sciences, and did them honour, without that ambition which is generally seen in men of learning: it was owing to this modesty that the greatest part of his works were published without his name. He published in 1711, a French and German dictionary; a Course of Morality, in 1713; a Dictionary of Arts and Sciences, in 1721; and translated *Tacitus de moribus Germanorum* into High Dutch, in 1724.

JABNE (anc. geogr.), a town of Palestine, near Joppa; called *Jannia* or *Jannial*, by the Greeks and Romans. In *John* xv. it seems to be called *Jabneel*; but in 2 Chron. xxvi. *Jabne*. It was taken from the Philistines by Uzziah, who demolished its fortifications. Its port, called *Jannitarum portus*, lay between Joppa and Azotus.

JABOK (anc. geogr.), a river of the Peræa, the north boundary of the Amorites, running with an oblique course from the east into the river Jordan.

JACCA, an ancient town of Spain, in the kingdom of Arragon, with a bishop's see, and a fort; seated on a river of the same name, among the mountains of Jicca, which are part of the Pyrenees. W. Long. o. 19. N. Lat. 44. 22.

JACK, in mechanics, a well-known instrument of common use for raising great weights of any kind.

The common kitchen-jack is a compound engine, where the weight is the power applied to overcome the friction of the parts and the weight with which the spit is charged; and a steady and uniform motion is obtained by means of the fly.

JACK, in the sea-language, a sort of flag or colours, displayed from a mast erected on the outer end of a ship's bowsprit. In the British navy the jack is nothing more than a small union flag, composed of the intersection of the red and white crosses; but in merchant-ships this union is bordered with a red field. See the article *UNION*.

JACK-Flag, in a ship, that hoisted up at the sprit-sail top-mast head.

JACK-Daw, the English name of a species of corvus. See *CORVUS*.

This bird is very mischievous to the farmer and gardener; and is of such a thievish disposition, that he will carry away much more than he can make use of. There is a method of destroying them by a kind of springs much used in England; and is so useful, that it ought to be made universal.—A stake of about five feet long is to be driven firmly into the ground, and made so fast that it cannot move, and so sharp in the point that the bird cannot settle upon it. Within a foot of the top there must be a hole bored thro' it, of three quarters of an inch diameter; through this hole is to be put a stick of about eight inches long; then a horse-hair spring or noose is to be made fast to a thin hazel-wand, and this brought up to the place where the short stick is placed, and carried with it through the hole, the remainder being left open under that stick. The other end of the hazel rod is to be put through a hole in the stake near the ground, and fastened there. The stake is to be planted among the jack-daw's food, and he will naturally be led to settle on it; but finding the point too sharp, he will descend to the little cross stick. This will sink with his weight, and the spring will receive his leg, and hold him fast.

JACKALL, in zoology. See *CANIS*.

JACKSON (Thomas), an eminent English divine, was born at Witton in the bishopric of Durham in 1579, of a good family. He commenced doctor of divinity at Oxford in 1622; and at last was made chaplain in ordinary, prebendary of Winchester, and dean of Peterborough. He was a very great scholar; and died in 1640. His performance upon the Creed,

is a learned and valuable piece; which, with his other works, was published in 1673.

JACOB (Ben Hajim), a rabbi famous for the collection of the Masorah in 1525; together with the text of the bible, the Chaldaic paraphrase, and Rabbinical commentaries.

JACOB (Ben Naphthali), a famous rabbi of the 5th century; he was one of the principal massorets, and bred at the school of Tiberias in Palestine with Ben Afer, another principal massoret. The invention of points in Hebrew to serve for vowels, and of accents to facilitate the reading of that language, are ascribed to these two rabbis; and said to be done in an assembly of the Jews held at Tiberias, A. D. 476.

JACOB (Giles), an eminent law-writer, born at Romsey in the county of Southampton, in 1686. He was bred under a considerable attorney; and is principally known for his *Law Dictionary* in one vol. folio, which has been often printed; a new and improved edition having been lately given by counsellors Ruffhead and Morgan. Mr Jacob also wrote two dramatic pieces; and a *Postal Register*, containing the lives and characters of English dramatic poets. The time of his death is not known.

JACOBÆUS (Oliker), a celebrated professor of physic and philosophy at Copenhagen, was born in 1651 at Arhusen in the peninsula of Jutland, where his father was bishop. Christian V. intrusted him with the management of his grand cabinet of curiosities; and Frederic IV. in 1698, made him counsellor of his court of justice. He wrote many medical works, and some excellent poems.

JACOBINE MONKS, the same with *DOMINICANS*.

JACOBITES, a term of reproach bestowed on the persons who, vindicating the doctrines of passive obedience and non-resistance with respect to the arbitrary proceedings of princes, disavow the revolution in 1688, and assert the supposed rights and adhere to the interests of the late abdicated king James and his family.

JACOBITES, in church-history, a sect of Christians in Syria and Mesopotamia; so called, either from Jacob a Syrian who lived in the reign of the emperor Mauritius, or from one Jacob a monk who flourished in the year 550.

The Jacobites are of two sects, some following the rites of the Latin church, and others continuing separated from the church of Rome. There is also a division among the latter, who have two rival patriarchs. As to their belief, they hold but one nature in Jesus Christ; with respect to purgatory and prayers for the dead, they are of the same opinion with the Greeks and other eastern Christians: they consecrate unleavened bread at the eucharist, and are against confession, believing that it is not of divine institution.

JACOBUS, a gold coin, worth 25 shillings; so called from king James the first of England, in whose reign it was struck. See *COIN*.

We usually distinguish two kinds of *Jacobus*, the *old* and the *new*; the former valued at 25 shillings, weighing six pennyweight ten grains: the latter, called also *Carolus*, valued at 23 shillings; in weight five pennyweight twenty grains.

JACUÉLOT. See *JACUÉLOT*.

JACU.

Jaculator
||
Jago.

JACULATOR, or SHOOTING-FISH. See **CHETODON**.
JAFFA, the modern name of the city of **JOPPA** in Judæa.

JAFNAPATAN, a sea-port town, seated at the north-east end of the island of Ceylon in the East Indies. The Dutch took it from the Portuguese in 1658, and have continued in the possession of it since that time. They export from thence great quantities of tobacco, and some elephants, which are accounted the most docile of any in the whole world. E. Long. 80. 25. N. Lat. 9. 30.

JAGENDORF, a town and castle of Silesia, capital of a province of the same name, seated on the river Oppa. E. Long. 17. 47. N. Lat. 50. 4.

St JAGO, a large river of South America, which rises in the audience of Quito and Peru. It is navigable; and falls into the South Sea, after having watered a fertile country abounding in cotton-trees, and inhabited by wild Americans.

St Jago, the largest, most populous and fertile of the Cape Verd islands on the coast of Africa, and the residence of the Portuguese viceroy. It lies about 13 miles eastward from the island of Mayo, and abounds with high barren mountains; but the air, in the rainy season, is very unwholesome to strangers. Its produce is sugar, cotton, wine, and some excellent fruits. The animals are black cattle, horses, asses, deer, goats, hogs, civet-cats, and some very pretty green monkeys with black faces.

St JAGO, a handsome and considerable town of South America, the capital of Chili, with a good harbour, a bishop's see, and a royal audience. It is seated in a large and beautiful plain, abounding with all the necessities of life, at the foot of the Cordilleras, on the river Mapocho, which runs across it from east to west. Here are several canals and a dyke, by means of which they water the gardens and cool the streets.—It is very much subject to earthquakes. W. Long. 69. 35. S. Lat. 33. 40.

St JAGO de Cuba, a town of North America, situated on the southern coast of the island of Cuba in the bottom of a bay with a good harbour, and on a river of the same name. W. Long. 76. 44. N. Lat. 20. 0.

JAGO de los Caballeros, a town of America, and one of the principal of the island of Hispaniola. It is seated on the river Yague, in a fertile soil, but bad air. W. Long. 70. 5. N. Lat. 19. 40.

St JAGO del Entero, a town of South America, one of the most considerable of Tucuman, and the usual residence of the inquisitor of the province. It is seated on a large river, in a flat country, where there is game, tygers, guanacos, commonly called *camel sheep*, &c.

JAGO de la Vega, otherwise called *Spanish-town*, is the capital of the island of Jamaica, in America, where the assembly and the grand courts of justice are held. It is seated in a fine pleasant valley, on the banks of the Rio Cobre. It was once a large, populous place, containing 2000 houses, two churches, a monastery, and several private chapels; but it is now reduced to a small compass, and has only one fine church, and a chapel, with about 500 inhabitants. Being an inland place, its trade is small; but several wealthy merchants and gentlemen reside there, living in a gay manner. There are a great number of

coaches; and they have lately got a playhouse, with good actors. It is seated near the south-east part of the island, in W. Long. 76. 45. N. Lat. 18. 20.

JAQUAR, a name given to the Brazilian once, a species of **FELIS**.—It grows to the size of a wolf: its hair of a bright tawny colour; the breast and belly whitish; the tail shorter than the body, the upper part deep tawny, marked irregularly with black spots. It inhabits the hottest parts of South America from the Isthmus of Darien to Buenos Ayres; is fierce, and destructive to man and beast. Like the tiger, it plunges its head into the body of its prey, and sucks out the blood before it devours it; makes a great noise like the howling of a hungry dog; and is a very cowardly animal, easily put to flight either by the shepherd dogs or by a lighted torch, being very fearful of fire. It lies in ambush near the sides of rivers.—There is sometimes seen a singular combat between this animal and the crocodile: when the jaquar comes to drink, the crocodile, ready to surprise any animal that approaches, raises its head out of the water; the former strikes its claws into the eyes, the only penetrable part of this dreadful reptile, who immediately dives under water, pulling his enemy along with him, where they commonly both perish.

JAIL-FEVER, a very dangerous distemper of the contagious kind, arising from the putrescent disposition of the blood and juices. See (the *Index* subjoined to) **MEDICINE**.

JALAP, in botany and the materia medica, the root of a species of convolvulus or bind-weed. See **CONVOLVULUS**.

This root is brought to us in thin transverse slices from Xalapa, a province of New Spain. Such pieces should be chosen as are most compact, hard, weighty, dark-coloured, and abound most with circular fibres. Slices of bryony root are said to be sometimes mixed with jalap; but these may be easily distinguished by their whiter colour and less compact texture. Jalap has no smell, and very little taste upon the tongue; but when swallowed it affects the throat with a sense of heat, and occasions a plentiful discharge of saliva.—Taken in substance in a dose of about half a dram, (less or more according to the circumstances of the patient), in plethoric or cold phlegmatic habits, it proves an effectual and in general a safe purgative, performing its office mildly, seldom occasioning nausea or gripes which too frequently accompany the other strong cathartics. In hypochondriacal disorders, and hot bilious habits, it gripes violently if the jalap is good; but rarely takes due effect as a purge. An extract made by water purges almost universally, but weakly; and at the same time has a considerable effect by urine. The root remaining after this process, gripes violently. The pure resin prepared with spirit of wine occasions most violent gripings and other terrible symptoms, but scarce proves at all cathartic; triturated with sugar, or with almonds into the form of an emulsion, or dissolved in spirit and mixed with syrups, it purges plentifully in a small dose, without occasioning much disorder. The part of the jalap remaining after the separation of the resin yields to water an extract which has no effect as a cathartic, but operates powerfully by urine.—Hoffman particularly cautions against giving jalap to children; and assures us, that it will

Jaquar
||
Jalap.

will destroy appetite, weaken the body, and perhaps occasion even death: but herein he is contradicted by Geoffroy; who observes, that children whose vessels are lax, and the food soft and lubricating, bear these kinds of medicines better than adults.—Certain it is, however, that jalap, when given to children, most frequently proves emetic as well as cathartic.

JAMAICA, an island of the West Indies, the largest of the Antilles, lying between 17° and 19° N. Lat. and between 76° and 79° W. Long.; in length near 170 miles, and about 60 in breadth. It approaches in its figure to an oval. The windward passage right before it hath the island of Cuba on the west, and Hispaniola on the east, and is about 20 leagues in breadth.

This island was discovered by admiral Christopher Columbus in his second voyage, who landed upon it May 5. 1494; and was so much charmed with it, as always to prefer it to the rest of the islands; in consequence of which, his son chose it for his dukedom. It was settled by Juan de Esquivel A. D. 1509, who built the town, which, from the place of his birth, he called *Seville*, and 11 leagues farther to the east stood Melilla. Oritan was on the fourth side of the island, seated on what is now called *Blue Fields River*. All these are gone to decay; but St Jago, now Spanish Town, is still the capital. The Spaniards held this country 160 years, and in their time the principal commodity was cacao; they had an immense flock of horses, asses, and mules, and prodigious quantities of cattle. The English landed here under Penn and Venables, May 11, 1654, and quickly reduced the island. Cacao was also their principal commodity till the old trees decayed, and the new ones did not thrive; and then the planters from Barbadoes introduced sugar-canes, which hath been the great staple ever since.

The prospect of this island from the sea, by reason of its constant verdure, and many fair and safe bays, is wonderfully pleasant. The coast, and for some miles within, the land is low; but removing farther, it rises and becomes hilly. The whole isle is divided by a ridge of mountains running east and west, some rising to a great height: and these are composed of rock, and a very hard clay; through which, however, the rains that fall incessantly upon them, have worn long and deep cavities, which they call *gullies*. These mountains, however, are far from being unpleasant, as they are crowned even to their summits by a variety of fine trees. There are also about a hundred rivers that issue from them on both sides; and, though none of them are navigable for any thing but canoes, are both pleasing and profitable in many other respects. The climate, like that of all countries between the tropics, is very warm towards the sea, and in marshy places unhealthy; but in more elevated situations, cooler; and, where people live temperately, to the full as wholesome as in any part of the West Indies. The rains fall heavy for about a fortnight in the months of May and October; and as they are the cause of fertility, are styled seasons. Thunder is pretty frequent, and sometimes showers of hail: but ice or snow, except on the tops of the mountains, are never seen; but on them, and at no very great height, the air is exceedingly cold.

The most eastern parts of this ridge are famous under the name of the *Blue Mountains*. This great chain of rugged rocks defends the south side of the

island from those boisterous north-west winds, which might be fatal to their produce. Their streams, though small, supply the inhabitants with good water, which is a great blessing, as their wells are generally brackish. The Spaniards were persuaded that these hills abounded with metals: but we do not find that they wrought any mines; or if they did, it was only copper, of which they said the bells in the church of St Jago were made. They have several hot springs, which have done great cures. The climate was certainly more temperate before the great earthquake; and the island was supposed to be out of the reach of hurricanes, which since then it hath severely felt. The heat, however, is very much tempered by land and sea breezes; and it is asserted, that the hottest time of the day is about eight in the morning. In the night, the wind blows from the land on all sides, so that no ships can then enter their ports.

In an island so large as this, which contains above five millions of acres, it may be very reasonably conceived that there are great variety of soils. Some of these are deep, black, and rich, and mixed with a kind of potter's earth; others shallow and sandy; and some of a middle nature. There are many savannahs, or wide plains, without stones, in which the native Indians had luxuriant crops of maize, which the Spaniards turned into meadows, and kept in them prodigious herds of cattle. Some of these savannahs are to be met with even amongst the mountains. All these different soils may be justly pronounced fertile, as they would certainly be found, if tolerably cultivated, and applied to proper purposes. A sufficient proof of this will arise from a very cursory review of the natural and artificial produce of this spacious country.

It abounds in maize, pulse, vegetables of all kinds, meadows of fine grass, a variety of beautiful flowers, and as great a variety of oranges, lemons, citrons, and other rich fruits. Useful animals there are of all sorts, horses, asses, mules, black cattle of a large size, and sheep, the flesh of which is well tasted, though their wool is hairy and bad. Here are also goats and hogs in great plenty; sea and river fish; wild, tame, and water fowl. Amongst other commodities of great value, they have the sugar-cane, cacao, indigo, pimento, cotton, ginger, and coffee; trees for timber and other uses, such as mahogany, manchineel, white wood, which no worm will touch, cedar, olives, and many more. Besides these, they have fustick, red wood, and various other materials for dyeing. To these we may add a multitude of valuable drugs, such as guaiacum; china, sarsaparilla, cassia, tamarinds, vanillas, and the prickly pear or opuntia, which produces the cochineal; with no inconsiderable number of odoriferous gums. Near the coast they have salt-ponds, with which they supply their own consumption, and might make any quantity they pleased.

As this island abounds with rich commodities, it is happy likewise in having a number of fine and safe ports. Point Morant, the eastern extremity of the island, hath a fair and commodious bay. Passing on to the south, there is Port Royal: on a neck of land which forms one side of it, there stood once the fairest town in the island; and the harbour is as fine a one as can be wished, capable of holding a thousand large vessels, and still the station of our squadron. Old Harbour is also a convenient port, so is Maccary Bay; and

and there are at least twelve more between this and the western extremity, which is Point Negrillo, where our ships of war lie when there is a war with Spain. On the north side there is Orange Bay, Cold Harbour, Rio Novo, Montego Bay, Port Antonio one of the finest in the island, and several others. The north-west winds, which sometimes blow furiously on this coast, render the country on that side less fit for canes, but pimento thrives wonderfully; and certainly many other staples might be raised in small plantations, which are frequent in Barbadoes, and might be very advantageous here in many respects.

The town of Port Royal stood on a point of land running far out into the sea, narrow, sandy, and incapable of producing any thing. Yet the excellence of the port, the convenience of having ships of seven hundred tons coming close up to their wharfs, and other advantages, gradually attracted inhabitants in such a manner, that though many of their habitations were built on piles, there were near two thousand houses in the town in its most flourishing state, and which let at high rents. The earthquake by which it was overthrown happened on the 7th of June 1692, and numbers of people perished in it. This earthquake was followed by an epidemic disease, of which upwards of three thousand died: yet the place was rebuilt; but the greatest part was reduced to ashes by a fire that happened on the 9th of January 1703, and then the inhabitants removed mostly to Kingston. It was, however, rebuilt for the third time; and was rising towards its former grandeur, when it was overwhelmed by the sea, August 20. 1722. There is, notwithstanding, a small town there at this day. Hurricanes since that time have often happened, and occasioned terrible devastations; yet they have been less frequent and less violent of late years, and the climate is also said to be altered for the better.

In so large an island as this, it might be expected there should be a considerable number of great towns; which, however, there is not. The reason of this is very obvious; for the wealth of the inhabitants arising from their plantations, of which there are at present about five hundred, and each of these containing some hundreds of inhabitants, it appears from hence that every plantation forms a village, and accounts sufficiently for the disposal of the greatest part of the inhabitants. There are however some few towns; the largest of which is Kingston, which stands on the harbour of Port Royal, contains about 1600 houses, and is very populous. St Jago de la Vega, or, as it is usually called, *Spanish Town*, is properly the capital of the island, being the residence of the governor, the place where the assembly meets, and is also the seat of the principal courts of justice.

The administration of public affairs is by a governor and council of royal appointment, and the representatives of the people in the lower house of assembly. They meet at Spanish Town, and things are conducted with great order and dignity. The colony hath a considerable public revenue; of which the quit-rents, by a grant of the crown, make a part. Another branch arises from a tax or fine laid upon such as keep fewer than three white to 100 black servants. This is preferring the ease to the security of the community, in respect to which it would have operated much

more beneficially as a regulation. The island is divided into three counties, Middlesex, Surry, and Cornwall, containing 19 parishes, over each of which presides a magistrate styled a *justice*, but these parishes in point of size are a kind kind of hundreds. Yet is this fine country, upon the whole, but thinly peopled, and indifferently cultivated; for though near a fourth part of the lands are patented, yet not above a ninth part is actually under cultivation. The commerce of Jamaica is very considerable, not only with all parts of Great Britain and Ireland, but with Africa, North and South America, the West India islands, and the Spanish main, for the encouragement of which a late act was passed. The ships annually employed are upwards of 500 sail. The number of inhabitants is very uncertain; some say about 30,000 or perhaps more whites, and about 170,000 negroes.

The following account of the exports of this island, in 1770, will contribute more than all that hath been said, to shew the importance of Jamaica. They consisted in 2249 bales of cotton, which at 10 pounds per bale, the price in the island, amounts to 22,490 l.; 1873 hundred weight of coffee, at three pounds five shillings per hundred, 6088 l.; 2753 bags of ginger, at two pounds five shillings per bag, 6194 l.; 2211 hides, at seven shillings per hide, 773 l.; 15,796 hog-sheads of rum, at ten pounds per hoghead, 157,960 l. To Ireland, 679 hogheads, at ten pounds per hoghead, 6790 l. Mahogany, 15,282 pieces, and 8500 feet, 50,000 l. Of pimento, 2,089,734 pounds weight, 52,243 l. Sugar, 57,675 hogheads, 6425 weights, 52 barrels, at seventeen pounds ten shillings per hoghead, twelve pounds per tierce, and four pounds per barrel, amounting in the whole to 1,086,620 l. Sarsaparilla, 205 bags, at ten pounds per bag, 2250 l. Exports to Great Britain and Ireland 1,391,210 l. To North America, 146,324 l. To the other islands, 595 l. Total of the exports, 1,538,730 l.

JAMBI, or JAMBIS, a sea-port town and small kingdom of Asia, on the eastern coast of the island of Sumatra. It is a trading place. The Dutch have a fort here; and export pepper from thence, with the best sort of canes. E. Long. 103. 55. S. Lat. 0. 30.

IAMBIC, in ancient poetry, a sort of verse, so called from its consisting either wholly, or in great part, of iambus's. See IAMBUS.

Ruddiman makes two kinds of iambic, viz. dimeter and trimeter; the former containing four feet, and the latter six. And as to the variety of their feet, they consist wholly of iambus's, as in the two following verses of Horace:

Dim. ¹ ² ³ ⁴ ⁵ ⁶
Inar|sit a|fuo|fui|

Trim. *Suis | & ipsa Ro|ma viribus|ruit.*

Or, a dactylus, spondeus, anapestus, and sometimes tribrachys, obtain in the odd places; and the tribrachys also in the even places, excepting the last. Examples of all which may be seen in Horace; as,

Dimeter.

¹ ² ³ ⁴ ⁵ ⁶
Canid|a tra|stavit|dapes|

Vide|re prosper|ante domum|

Trimeter.

Quod quid|sceler|si ruit|is aut|ser dex|teris|

Prius|que cælum|sudet in|serui|maris|

Aliti-

*Alitibus alijs canibus hominid' Hecforem.
Pavidumque lep' aut advenam laqueogræm.*

JAMBLICUS, the name of two celebrated Platonic philosophers, one of whom was of Colchis, and the other of Apamea in Syria. The first, whom Julian equals to Plato, was the disciple of Anatolius and Porphyry, and died under the reign of the emperor Constantine.—The second also enjoyed great reputation. Julian wrote several letters to him, and it is said he was poisoned under the reign of Valens.—It is not known to which of the two we ought to attribute the works we have in Greek under the name of *Jamblicus*, viz. 1. The history of the life of Pythagoras, and the sect of the Pythagoreans. 2. An exhortation to the study of philosophy. 3. A piece against Porphyry's letter on the mysteries of the Egyptians.

IAMBUS, in the Greek and Latin prosody, a poetical foot, consisting of a short syllable followed by a long one; as in

ὄν, μέγ, υ', υ', υ', υ',
ὄν, μέγ, υ', υ', υ', υ',

Syllaba longa brevi subiecta vocatur iambus, as Horace expresses it; who also calls the iambus a swift, rapid foot, *pes citus*.

The word, according to some, took its rise from Iambus, the son of Pan and Echo, who invented this foot; or, perhaps, who only used sharp-biting expressions to Ceres, when afflicted for the death of Proserpine. Others rather derive it from the Greek ἰαμβικός, *venenum*, "poison;" or from ἰαμβίζω, *maledico*, "I rail, or revile;" because the verses composed of iam-bus's were at first only used in satire.

JAMES (St.), called the *Great*, the son of Zebedee, and the brother of John the evangelist, was born at Bethsaida, in Galilee. He was called to be an apostle, together with St John, as they were mending their nets with their father Zebedee, who was a fisherman; when Christ gave them the name of *Boanerges*, or *Sons of Thunder*. They then followed Christ, were witnesses with St Peter of the transfiguration on mount Tabor, and accompanied our Lord in the garden of olives. It is believed that St James first preached the gospel to the dispersed Jews; and afterwards returned to Judea, where he preached at Jerusalem, when the Jews raised up Herod Agrippa against him, who put him to a cruel death about the year 44. Thus St James was the first of the apostles who suffered martyrdom. St Clement of Alexandria relates, that his accuser was so struck with his constancy, that he became converted and suffered with him. There is a magnificent church at Jerusalem which bears the name of *St James*, and belongs to the Armenians. The Spaniards pretend, that they had St James for their apostle, and boast of possessing his body; but Baronius, in his *Annals*, refutes their pretensions.

JAMES (St.), called the *Less*, an apostle, the brother of Jude, and the son of Cleophas and Mary the sister of the mother of our Lord, is called in Scripture the *Just*, and the brother of Jesus, who appeared to him in particular after his resurrection. He was the first bishop of Jerusalem, when Ananias II. high priest of the Jews, caused him to be condemned, and delivered him into the hands of the people and the Pharisees, who threw him down from the steps of the temple, when a fuller dashed out his brains with a club, about

the year 62. His life was so holy, that Josephus considers the ruin of Jerusalem as a punishment inflicted on that city for his death. He was the author of the epistle which bears his name.

JAMES, the name of several kings of Scotland and of Great Britain. See (*Histories of*) SCOTLAND and BRITAIN.

JAMES I. king of Scotland, 1423, the first of the house of Stuart, was taken prisoner by the English in 1406, who were at war with Robert III. his father; and remained so till 1424, when he was set at liberty by John duke of Bedford regent of England during the minority of Henry VI. In 1437, this unfortunate prince was assassinated in his bed by the relations of those whom he had punished for mal-administration during his imprisonment.

JAMES II. king of Scotland, 1437, succeeded his father, being then but seven years of age; and was killed at the siege of Roxburgh in 1460, aged 29. This prince wrote, 1. A panegyric on his queen, before he was married to him. 2. Scotch sonnets: one of them, a lamentation while in England, is in manuscript in the Bodleian library, and bestows great praises on Gower and Chaucer. 3. *Rythmi Latini*. 4. On music.

JAMES III. king of Scotland, succeeded his father in 1460. He was a tyrannical prince; and having irritated his subjects, they rebelled against him, and he was slain by them in battle in 1488, aged 35.

JAMES IV. king of Scotland, succeeded his father in 1488. He was a pious and valiant prince; subdued his rebellious subjects; and afterwards, taking part with Louis XII. against Henry VIII. of England, he was slain in the battle of Flouden-Field in 1513, aged 41.

JAMES V. king of Scotland, in 1513, was but 18 months old when his father lost his life. When of age, he assisted Francis I. king of France, against the emperor Charles le Quint; for which service Francis gave him his eldest daughter in marriage, in 1535. This prince died in two years; and James married Mary of Lorraine, daughter of Claud duke of Guise, and widow of Louis d'Orleans, by whom he had only one child, the unfortunate Mary queen of Scots, born only eight days before his death, which happened December 13. 1542. This was the first prince of his family who died a natural death, since its elevation to the throne. He wrote the celebrated ballad called *Christ's Kirk on the Green*, and other little poems, which, at least, tradition reports to have been of his composition. They have a character of ease and libertinism, says Mr Walpole, which makes the tradition the more probable, and are to be found in a collection of Scottish poems called *The Evergreen*; the *Gaber-lunzie Man* is reckoned the best. There is something very ludicrous in the young woman's distress when she thought that her first favour had been thrown away on a beggar.

JAMES I. king of England in 1603, and VI. of Scotland in 1567, son of Mary queen of Scots; whom he succeeded in Scotland, as he did Elizabeth in England. Strongly attached to the Protestant religion, he signalized himself in its support; which gave rise to the horrid conspiracy of the Papists to destroy him and all the English nobility by the Gunpowder Plot, discovered

vered November 5. 1605. The following year, a political test of loyalty was required, which secured the king's person, by clearing the kingdom of those disaffected Roman-Catholic subjects who would not submit to it. The chief glory of this king's reign consisted in the establishment of new colonies, and the introduction of some manufactures. The nation enjoyed peace, and commerce flourished during his reign. Yet his administration was despised both at home and abroad: for, being the head of the Protestant cause in Europe, he did not support it in that great crisis, the war of Bohemia; abandoning his son-in-law the elector Palatine; negotiating when he should have fought, deceived at the same time by the courts of Vienna and Madrid; continually sending illustrious ambassadors to foreign powers, but never making a single ally. He valued himself much upon his polemical writings; and so fond was he of theological disputations, that to keep them alive, he founded, for this express purpose, Chelsea-college; which was converted to a much better use by Charles II. His *Basilicon Doron*, Commentary on the Revelation, writings against Bellarmine, and his *Dæmonologia*, or doctrine of witchcraft, are sufficiently known. There is a collection of his writings and speeches in one folio volume. Several other pieces of his are extant; some of them in the Cabala, others in manuscript in the British Museum, and others in Howard's collection. He died in 1625, in the 59th year of his age, and 23d of his reign.

JAMES II. king of England, Scotland, &c. 1685, grandson of James I. succeeded his brother Char. II. It is remarkable, that this prince wanted neither courage nor political abilities whilst he was duke of York; on the contrary, he was eminent for both: but when he ascended the throne, he was no longer the same man. A bigot from his infancy to the Romish religion and to its hierarchy, he sacrificed every thing to establish them, in direct contradiction to the experience he had acquired, during the long reign of his brother, of the genius and character of the people he was to govern. Guided by the jesuit Peters his confessor, and the infamous chancellor Jeffries, he violated every law enacted for the security of the Protestant religion; and then, unable to face the resentment of his injured subjects, he fled like a coward, instead of disarming their rage by a dismissal of his Popish ministers and priests. He rather chose to live and die a bigot, or, as he believed, a saint, than to support the dignity of his ancestors, or perish beneath the ruins of his throne. The consequence was the revolution in 1689. James II. died in France in 1710, aged 68. He wrote Memoirs of his own life and campaigns to the restoration; the original of which is preserved in the Scotch college, at Paris. This piece is printed at the end of Ramsay's life of Marshal Turenne. 2. Memoirs of the English affairs, chiefly naval, from the year 1660 to 1673. 3. The royal sufferer, king James II. consisting of meditations, soliloquies, vows, &c. said to be composed by his majesty at St Germain. 4. Three letters; which were published by William Fuller, gent. in 1702, with other papers relating to the court of St Germain, and are said in the title-page to be printed by command.

JAMES (Thomas), a learned English critic and divine, born about the year 1571. He recommended

himself to the office of keeper of the public library at Oxford, by the arduous undertaking of publishing a catalogue of the MSS. in each college-library at both universities. He was elected to this office in 1602, and held it 18 years, when he resigned it to prosecute his studies with more freedom. In the convocation held with the parliament at Oxford in 1625, of which he was a member, he moved to have proper commissioners appointed to collate the MSS. of the fathers in all the libraries in England, with the Popish editions, in order to detect the forgeries in the latter; but this proposal not meeting with the desired encouragement, he engaged in the laborious task himself, which he continued until his death in 1629. He left behind him a great number of learned works.

JAMES (Richard), nephew of the former, entered into orders in 1615; but, being a man of humour, of three sermons preached before the university, one concerning the observation of Lent was without a text, according to the most ancient manner; another against the text; and the third beside it. About the year 1619, he travelled through Wales, Scotland, Shetland, into Greenland, and Russia, of which he wrote observations. He assisted Selden in composing his *Marmora Arundelliana*; and was very serviceable to Sir Robert Cotton, and his son Sir Thomas, in disposing and settling their noble library. He died in 1638; and has an extraordinary character given him by Wood for learning and abilities.

Knights of St JAMES, a military order in Spain, first instituted about the year 1170 by Ferdinand II. king of Leon and Galicia. The greatest dignity belonging to this order is that of Grand Master, which has been united to the crown of Spain. The knights are obliged to make proof of their descent from families that have been noble, for four generations, on both sides; they must likewise make it appear, that their said ancestors have neither been Jews, heretics, nor Saracens; nor have ever been called into question by the inquisition. The novices are obliged to serve six months in the galleys, and to live a month in a monastery; they observe the rules of St Austin, making no vows but of poverty, obedience, and conjugal fidelity.

JAMES's Powder, an antimonial medicine, somewhat of the nature of tartar emetic, prepared by the late Dr Robert James, physician in London, who died on the 23d of March 1776. His powder was found to be of considerable efficacy in some kinds of fevers; so that it is much to be regretted, that the inventor thought proper to conceal his method of preparing it even till his death.

JAMES-Town, in North America, was once the capital of Virginia, but now Williamsburg claims that honour. It is seated on a peninsula on the north side of James river; and consists of about 80 houses, chiefly for the entertainment of seafaring men; for the seat of the government, and the courts of justice, have been removed to Williamsburg, which is seven miles north of it. W. Long. 77. 30. N. Lat. 37. 0.

St JAMES's Day, a festival of the Christian church, observed on the 25th of July, in honour of St James the greater, son of Zebedee.

Epistle of St JAMES, a canonical book of the New Testament, being the first of the catholic or general epistles;

epistles; which are so called, as not being written to one but to several Christian churches.

This general epistle is addressed partly to the believing and partly to the infidel Jews; and is designed to correct the errors, soften the ungoverned zeal, and reform the indecent behaviour of the latter; and to comfort the former under the great hardships they then did, or shortly were to suffer, for the sake of Christianity.

JAMESONE (George), an excellent painter, justly termed the *Vandyke of Scotland*, was the son of Andrew Jamefone, an architect; and was born at Aberdeen, in 1586. He studied under Rubens, at Antwerp; and, after his return, applied with indefatigable industry to portraits in oil, though he sometimes practised in miniature, and also in history and landscapes. His largest portraits were somewhat less than life. His earliest works are chiefly on board, afterwards on a fine linen cloth smoothly primed with a proper tone to help the harmony of his shadows. His excellence is said to consist in delicacy and softness, with a clear and beautiful colouring; his shades not charged, but helped by varnish, with little appearance of the pencil. When king Charles I. visited Scotland in 1633, the magistrates of Edinburgh, knowing his majesty's taste, employed this artist to make drawings of the Scottish monarchs; with which the king was so pleased, that, inquiring for the painter, he sat to him, and rewarded him with a diamond-ring from his own finger. It is observable, that Jamefone always drew himself with his hat on, either in imitation of his master Rubens, or on having been indulged in that liberty by the king when he sat to him. Many of Jamefone's works are in both the colleges of Aberdeen; and the Sybils there he is said to have drawn from living beauties in that city. His best works are from the year 1630 to his death, which happened at Edinburgh in 1644.

JAMYN (Amadis), a celebrated French poet in the 16th century. He is esteemed the rival of Ronfard, who was his cotemporary and friend. He was secretary and chamber-reader in ordinary to Char. IX. and died about 1585. He wrote, 1. Poetical works, 2 vols. 2. Philosophical discourses to Pasicharis and Rodanthe, with seven academical discourses. 3. A translation of the Iliad of Homer, begun by Hugh Sabel, and finished by Jamyn; with a translation into French verse of the three first books of the Odyssey.

JANEIRO, a province of Brasil in South America, seated between the tropic of Capricorn, and 22° of S. Lat. It is bounded on the north by the province of Spirito Santo, on the east and south by the Atlantic Ocean, and on the west by the mountains which separate it from Guaira, in Spanish America. This is the most valuable province which the Portuguese are masters of; for they import from thence yearly great quantities of gold and precious stones, which they find in the mountains to a prodigious value.

JANICULUM, or JANICULARIS, a hill of Rome, added by Ancus Martius; the burial-place of Numa, and of Statius Cæcilius the poet: to the east and south, having the Tiber; to the west, the fields; to the north, a part of the Vatican. So called, either from an ancient city, (Virgil;) or because it was a *janua*, or gate, from which to issue out and make incursions on the Tuscan, (Verrius Flaccus.) Now called *Mons*

Aureus, corruptly *Montorius*, from its sparkling sands. From this hill, on account of its height, is the most extensive prospect of Rome: but it is less inhabited, because of its gross air; neither is it reckoned among the seven hills. Hitherto the people retired, and were hence afterwards recalled by Q. Hortensius the dictator, (Pliny.)

JANIZARIES, an order of infantry in the Turkish armies; reputed the grand seignior's foot-guards. Vossius derives the word from *geniziers*, which in the Turkish language signifies *novi homines* or *milites*. D'Herbelot tells us, that *jenitcheri* signifies a *new band*, or *troop*; and that the name was first given by Amurath I. called the *Conqueror*, who choosing out one fifth part of the Christian prisoners whom he had taken from the Greeks, and instructing them in the discipline of war and the doctrines of their religion, sent them to Hagi Bektasche (a person whose pretended piety rendered him extremely revered among the Turks), to the end that he might confer his blessing on them, and at the same time give them some mark to distinguish them from the rest of the troops.—Bektasche, after blessing them in his manner, cut off one of the sleeves of the fur-gown which he had on, and put it on the head of the leader of this new militia; from which time, viz. the year of Christ 1361, they have still retained the name *jenitcheri*, and the fur-cap.

As, in the Turkish army, the European troops are distinguished from those of Asia; the janizaries are also distinguished into *janizaries of Constantinople*, and of *Damascus*. Their pay is from two aspers to twelve *per diem*; for when they have a child, or do any signal piece of service, their pay is augmented.—Their dress consists of a dolymen, or long gown, with short sleeves, which is given them annually by the grand seignior on the first day of Ramazan. They wear no turban; but, in lieu of that, a kind of cap, which they call *zarcola*, and a long hood of the same stuff hanging on their shoulders. On solemn days they are adorned with feathers, which are stuck in a little case in the fore-part of the bonnet.—Their arms, in Europe, in time of war, are a sabre, a carabine or musquet, and a cartouch-box hanging on the left side. At Constantinople, in time of peace, they wear only a long staff in their hand. In Asia, where powder and firearms are more uncommon, they wear a bow and arrows, with a poinard, which they call *hanjare*.—Though the janizaries are not prohibited marriage, yet they rarely marry, nor then but with the consent of their officers; as imagining a married man to make a worse soldier than a bachelor.—It was Osman, or Ottoman, or, as others will have it, Amurath, who first instituted the order of janizaries. They were at first called *jaja*, that is, footmen, to distinguish them from the other Turks, the troops whereof consisted mostly of cavalry. The number of janizaries is generally above 40,000; divided into 162 companies or chambers called *odas*, in which they live together at Constantinople as in a convent. They are of a superior rank to all other soldiers, and are also more arrogant and factious, and it is by them that the public tranquillity is mostly disturbed. The government may therefore be said to be in the hands of the janizaries. They have, however, some good qualities: they are

employed to escort travellers, and especially ambassadors and persons of high rank, on the road; in which case, they behave with the utmost zeal and fidelity.

JANSEN (Cornelius), bishop of Ypres, one of the most learned divines of the 17th century, and principal of the sect called from his name *Janfenists*. He was born in Holland of Catholic parents, and studied at Louvain. Being sent to transact some business of consequence relating to the university, into Spain, the Catholicising, viewing with a jealous eye the intriguing policy of France, engaged him to write a book to expose the French to the pope as no good Catholics, since they made no scruple of forming alliances with Protestant states. Janfen performed this task in his *Mars Gallicus*; and was rewarded with a mitre, being promoted to the see of Ypres in 1635. He had, among other writings, before this, maintained a controversy against the Protestants upon the points of grace and predestination; but his *Augustinus* was the principal labour of his life, on which he spent above 20 years. See the next article.

JANSENISTS, in church-history, a sect of the Roman Catholics in France, who followed the opinions of Janfenius, bishop of Ypres, and doctor of divinity of the universities of Louvain and Douay, in relation to grace and predestination.

In the year 1640, the two universities just mentioned, and particularly father Molina and father Leonard Celsus, thought fit to condemn the opinions of the Jesuits on grace and free-will. This having set the controversy on foot, Janfenius opposed to the doctrine of the Jesuits the sentiments of St. Augustine; and wrote a treatise on grace, which he entitled *Augustinus*. This treatise was attacked by the Jesuits, who accused Janfenius of maintaining dangerous and heretical opinions; and afterwards, in 1642, obtained of pope Urban VIII. a formal condemnation of the treatise wrote by Janfenius: when the partisans of Janfenius gave out that this bull was spurious, and composed by a person entirely devoted to the Jesuits. After the death of Urban VIII. the affair of Janfenism began to be more warmly controverted, and gave birth to an infinite number of polemical writings concerning grace. And what occasioned some mirth, was the titles which each party gave to their writings: one writer published *The torch of St. Augustine*, another found *Snuffers for St. Augustine's torch*, and father Veron formed *A gag for the Janfenists*, &c. In the year 1650, 68 bishops of France subscribed a letter to pope Innocent X. to obtain an inquiry into and condemnation of the five following propositions, extracted from Janfenius's *Augustinus*: 1. Some of God's commandments are impossible to be observed by the righteous, even though they endeavour with all their power to accomplish them. 2. In the state of corrupted nature, we are incapable of resisting inward grace. 3. Merit and desert in a state of corrupted nature, does not depend on a liberty which excludes necessity, but on a liberty which excludes constraint. 4. The Semipelagians admitted the necessity of an inward preventing grace for the performance of each particular act, even for the beginning of faith; but they were heretics in maintaining that this grace was of such a nature, that the will of man was able either to resist or obey it. It is Semipelagianism to say, that Jesus Christ died, or shed

his blood, for all mankind in general.

In the year 1652, the pope appointed a congregation for examining into the dispute in relation to grace. In this congregation Janfenius was condemned; and the bull of condemnation, published in May 1653, filled all the pulpits in Paris with violent outcries and alarms against the heresy of the Janfenists. In the year 1656, pope Alexander VII. issued out another bull, in which he condemned the five propositions of Janfenius. However, the Janfenists affirm, that these propositions are not to be found in this book; but that some of his enemies having caused them to be printed on a sheet, inserted them in the book, and thereby deceived the pope. At last Clement XI. put an end to the dispute by his constitution of July 17. 1705; in which, after having recited the constitutions of his predecessors in relation to this affair, he declares, "That in order to pay a proper obedience to the papal constitutions concerning the present question, it is necessary to receive them with a respectful silence." The clergy of Paris, the same year, approved and accepted this bull, and none dared to oppose it.

This is the famous bull *Unigenitus*, so called from its beginning with the words *Unigenitus Dei Filius*, &c. which has occasioned so much confusion in France.

JANUARY, in chronology, the first month of the year, so called from JANUS, one of the ancient Roman deities, painted with two faces; one whereof was supposed to look towards the new year, and the other towards the old.—January was introduced into the year by Numa Pompilius; Romulus's year beginning in the month of March. The Christians heretofore fasted on the first of January, by way of opposition to the superstition of the heathens; who, in honour of Janus, observed this day with feasting, dancings, masquerades, &c.

JANUS, in heathen worship, the first king of Italy, who, it is said, received Saturn into his dominions, after his being driven from Arcadia by Jupiter. He tempered the manners of his subjects, and taught them civility; and from him they learned to improve the vine, to sow corn, and to make bread. After his death, he was adored as a god. Romulus caused a temple to be erected to him, the gates of which were open in time of war, and shut in time of peace. This temple was shut up, for the first time, in the reign of Numa; the second, after the first Punic war; and thrice under Augustus. Nero, Vespasian, and several others, observed the same ceremony; but we do not find that it was observed by the Christian emperors.

This deity was thought to preside over all new undertakings. Hence, in all sacrifices, the first libations of wine and wheat were offered to Janus, and all prayers prefaced with a short address to him. January, the first month of the year was dedicated to and named from him. At this festival, the Romans offered cakes of new meal and salt, with new wine and frankincense. Then the consuls for the new year solemnly entered on their office, all artificers and tradesmen began their works, quarrels were laid aside, mutual presents were made, and the day concluded with mirth and joy.

Janus was represented with two faces, either to denote his prudence, or that he views at once the past

and approaching years; he had a sceptre in his right hand, and a key in his left, to signify his extensive authority, and his invention of locks.

Tho' this is properly a Roman deity, the abbé la Pluche represents it as derived from the Egyptians, who made known the rising of the dog-star, which opened their solar year, with an image with a key in its hand, and two faces, one old and the other young, to typify the old and new year.

JAPAN, a general name for a great number of islands lying between the eastern coast of Asia and the western one of America, and which all together form a large and potent empire. They extend from the 30th to the 41st degree of latitude, and from the 130th to the 147th of east longitude.

Were South and North Britain divided by an arm of the sea, Japan might be most aptly compared to England, Scotland, and Ireland, with their respective smaller islands, peninsulas, bays, channels, &c. all under the same monarch.

The Europeans call the empire *Japan*; but the inhabitants *Nippon*, from the greatest island belonging to it; and the Chinese *Cippon*, probably on account of its eastern situation; these names signifying, in both languages, the *Basin* or *Foundation of the Sun*. It was first discovered by the Portuguese, some time betwixt the years 1535 and 1548.

Molt of the islands which compose it are surrounded with such high craggy mountains, and such shallow and boisterous seas, that sailing about them is extremely dangerous; and the creeks and bays are choked up with such rocks, shelves, and sands, that it looks as if Providence had designed it to be a kind of little world by itself. These seas have likewise many dangerous whirlpools, which are very difficult to pass at low water, and will suck in and swallow up the largest vessels, and all that comes within the reach of their vortex, dashing them against the rocks at the bottom; insomuch that some of them are never seen again, and others thrown upon the surface at some miles distance. Some of these whirlpools also make a noise terrible to hear.

The Chinese pretend that the Japan islands were first peopled by themselves: but it is more probable that the original inhabitants were a mixture of different nations, driven thither by those tempestuous seas, and at different times; and this conjecture is confirmed by the great difference observable between the present inhabitants, in regard to feature, complexion, shapes, habits, customs, and language, notwithstanding their having been so long united under one monarch.

As these islands lie in the fifth and sixth climates, they would be much hotter in summer than England, were not the heats refreshed by the winds which continually blow from the sea around them, and to which they are much exposed by the height of their situation: this circumstance, however, not only renders their winters excessive cold, but the seasons more inconstant. They have great falls of snow in winter, which are commonly followed by hard frosts. The rains in summer are very violent, especially in the months of June and July, which on that account are called *fat-suki*, or *water-months*. The country is also much subject to dreadful thunders and lightnings,

as well as storms and hurricanes, which frequently do a great deal of damage.

The soil, though naturally barren and mountainous, by the industry of the inhabitants, not only supplies them with every necessary of life, but also furnishes other countries with them; producing, besides corn, the finest and whitest rice, and other grains, with a great variety of fruits, and vast numbers of cattle of all sorts. Besides rice, and a sort of wheat and barley, with two sorts of beans, they have Indian wheat, millet, and several other kinds, in great abundance. Their seas, lakes, and rivers, abound with fish; and their mountains, woods, and forests, are well stocked with horses, elephants, deer, oxen, buffaloes, sheep, hogs, and other useful animals. Some of their mountains also are enriched with mines of gold, silver, and copper, exquisitely fine, besides tin, lead, iron, and various other minerals and fossils; whilst others abound with several sorts of marble and precious stones. Of these mountains, some may be justly ranked among the natural rarities of this country; one, in particular, in the great island of Nippon, is of such prodigious height as to be easily seen forty leagues off at sea, though its distance from the shore is about eighteen. Some authors think it exceeds the famous Peak of Teneriffe; but it may rather be called a cluster or group of mountains, among which are no less than eight dreadful volcanoes, burning with incredible fury, and often laying waste the country round about them: but, to make some amends, they afford great variety of medicinal waters, of different degrees of heat; one of these, mentioned by Varenus, is said to be as hot as burning oil, and to scorch and consume every thing thrown into it.

The many brooks and rivers that have their sources among the mountains, form a great number of delightful cascades, as well as some dreadful cataracts. Among the great variety of trees in the forests here, the cedars exceed all of that kind through India, for straightness, height, and beauty. They abound in most of the islands, especially the largest.

Their seas, besides fish, furnish them with great quantities of red and white coral, and some pearls of great value, besides a variety of sea-plants and shells; which last are not inferior to those that are brought from Amboyna, the Molucca and other eastern islands.

The vast quantity of sulphur, with which most of the Japan islands abound, makes them subject to frequent and dreadful earthquakes. The inhabitants are so accustomed to them, that they are scarcely alarmed at any, unless they chance to be very terrible indeed, and lay whole towns in ruins, which very often proves the case. On these occasions, they have recourse to extraordinary sacrifices, and acts of worship to their deities or demons, according to the different notions of each sect, and sometimes even proceed to offer human victims; but in this case they only take some of the vilest and most abandoned fellows they can meet with, because they are only sacrificed to the malevolent deities.

With respect to religion, that of the Japanese is allowed by all writers to have been downright heathenism and idolatry from time immemorial. They do not seem so much as to have any sort of notion of a Supreme Creator; but believe the world to have existed

from:

from eternity, and that the gods they worship were men or beings that lived on earth several thousands of years, and were afterwards, for their piety, mortification, and even by their voluntary death, raised to that height of power and dignity they have ever since enjoyed. They are divided, however, into various sects; probably according to the various nations that first settled there. One of them is called the *sect of Siutto*, which is that of their philosophers and moralists, whose professors, like the Chinese literati, despise all notions of public worship and popular superstition. Every person here is at liberty to choose what sect pleases him best, no compulsion being used by the government or by the parents. Most of the sects believe a future state of bliss or misery, though they are not agreed about the nature and duration of it: the generality, however, think that it will consist in a transmigration of the soul from one body to another, more or less excellent and happy, according to their behaviour in their late state; and that this revolution will continue, as well as the world, to eternal ages. All the different sects, or at least the priests and priestesses of them, however divided in other respects, agree in regarding the five following negative precepts as absolutely binding; 1. Not to kill, nor to eat any thing that is killed; 2. Not to steal; 3. Not to defile another man's bed; 4. Not to lie; 5. Not to drink wine. From the example of their two chief deities, Amida and Xaca, the Japanese have a notion of its being such a meritorious thing to dispatch one's self, that great numbers of them embrace, in the most public manner, a voluntary death, either by drowning, hanging, or flinging themselves down from a precipice, or by poison, dagger, or any other quick riddance. The followers of Xaca commonly drown themselves; but those of Amida shut themselves up in some close confined place, where they have just room to sit, and, being immured on every side, have only a little hole to breathe through by means of a small cane, and never cease calling on that deity till they expire.

There is not a country in all the east that abounds more with temples and monasteries than this: not only cities and towns, but plains and mountains, and even deserts, swarm with them; for the priests here, like those of the church of Rome, are either secular or regular. The former live in private houses of their own, allow themselves one or two wives, and live on the income and offerings made to their respective temples and deities, and are at their own liberty as to the practice of abstinence and other severities: the regulars live in communities, under their respective superiors, and lead more or less reclusive and austere lives, according to their sects. Some of the monasteries contain a thousand, or even more of them, who, besides a perpetual celibacy and other mortifications, are all bound to observe the five rules before mentioned. Both secular and regular are under the government of the dairo or high-priest, who is the head of all the religious and sects in the empire. Besides the multitude of idols in their temples, there is a great number of others set up in their other public buildings, in their piazzas and markets, streets, and even public roads.

The Japanese have as great variety of festivals as of sects and deities, which it would therefore be endless

to describe: they consist in general in the anniversary of their gods and of their dead relations.

Christianity, if Popery deserves that name, had once made a considerable progress in this country; but, about the year 1622, a dreadful persecution was raised against the missionaries, and all that adhered to them, occasioned partly by the indiscreet zeal of the former, partly by the jealousy of the unconverted nobles, but especially of the Japanese priests, who could not, without the greatest envy and regret, behold their old religion, with all its powerful attractions of profit, popular esteem, and respect, daily losing ground; but more particularly by the policy and treachery of the Dutch, who found effectual means to undermine them. All the Christian converts were put to death; and the Europeans, except the Dutch, forbid to come within the Japanese dominions under the severest penalties.

With respect to the government of these islands, it is and has been for a long time monarchical; though formerly it seems to have been split into a great number of petty kingdoms, which were at length all swallowed by one. The imperial dignity had been enjoyed, for a considerable time before the year 1500, by a regular succession of princes, under the title of *dairos*, a name supposed to have been derived from Dairo the head of that family. Soon after that epoch, such a dreadful civil war broke out, and lasted so many years, that the empire was quite ruined. During these distractions and confusions, a common soldier, by name Tayckoy, a person of obscure birth, but of an enterprising genius, found means to raise himself to the imperial dignity; having, in little more than three years time, by an uncommon share of good fortune subdued all his competitors and opponents, and reduced all their cities and castles. The dairo, not being in a condition to obstruct or put a stop to his progress, was forced to submit to his terms; and might perhaps have been condemned to much harder, had not Tayckoy been apprehensive lest his soldiers, who still revered their ancient natural monarch, should have revolted in his favour. To prevent this, he granted him the supreme power in all religious matters, with great privileges, honours, and revenues annexed to it; whilst himself remained invested with the whole civil and military power, and was acknowledged and proclaimed king of Japan. This great revolution happened in 1517, and Tayckoy reigned several years with great wisdom and tranquility; during which he made many wholesome laws and regulations, which still subsist, and are much admired to this day. At his death, he left the crown to his son Tayckoisama, then a minor; but the treacherous prince under whose guardianship he was left, deprived him of his life before he came of age. By this murder, the crown passed to the family of Jrjassama, in which it still continues. Tayckoy and his successors have contented themselves with the title of *cubo*, which, under the dairos, was that of prime minister, whose office is now suppressed; so that the cubo, in all secular concerns, is quite as absolute and despotic, and has as extensive a power over the lives and fortunes of all his subjects, from the petty kings down to the lowest persons, as ever the dairos had. The dairo resides constantly at Meaco, and the cubo at Jedo.

The Japanese traffic with the Chinese, Koreans, and people of Jetzo: but, of the European nations, the Dutch alone are suffered to trade with them; having declared, as some say, after the expulsion of the Portuguese, that they were no Christians; but more probably on the merit of supplanting and assisting in expelling the Portuguese: for it is impossible that the Japanese can be ignorant that the Dutch profess Christianity, as they trade to China; and we find the Japanese use as much caution in their commerce with the Dutch as if they were really Christians.

At the season that the Dutch fleet is expected, the governor of Nangasack places centinels on the hills to give notice of the approach of any ships. When they appear, a boat is sent off to every ship, with a waiter or officer; and as soon as the ships come to an anchor, an express is immediately dispatched to court, before whose return the Dutch may not dispose of any thing. In the mean time, the particulars of every ship's cargo are taken, with the name, age, stature, and office, of every man on board, which is translated and printed in the Japanese language. When the express is returned, the ships crew are permitted to come on shore, and are all multered before a Japanese commissary; and every person is called over aloud, and made to give an account of his age, quality, and office, to see if it agrees with the particulars given in by the Dutch: after this examination they are sent on board again, and the sails of the ship, with the guns, arms, ammunition, and helm, are brought on shore, and the hatches sealed down by a Japanese officer; nor can they be opened, whatever the ship's crew may want, without a permission from the governor, who always sends a person to see what is taken out, and seal them down again; nor dare the Dutch sailors light a candle or make any fire on board their ships, any more than on shore. The ships are allowed no communication with one another; nor is any officer or sailor suffered to go on shore, except the persons who are appointed to carry the company's present to the king at Jedo or Yeddo. His majesty having accepted the present, and prepared another for the company, the Dutch officer is conveyed to Nangasack under a strong guard as he came. This journey, and the transacting their mercantile affairs, usually take up about three months and a half.

The Dutch, who attend the king on this occasion, approach him on their knees, with their hands joined together, and carried to their foreheads, as the Japanese governors and ministers also do.

While the Dutch ships lie in the road, none of the Japanese are allowed to go on board them to trade with the sailors; and those that carry provisions on board are not suffered to take any money for them till the permission to trade comes from court, and then they deliver in their accounts and are paid. After this, the Japanese permit six persons from every vessel to come on shore, and buy and sell for themselves, and stay four days, either in Dinsia or in the city, as they see fit; when these six men return on board, six others are allowed to go on shore and traffic in the like manner, and so on.

The goods are generally paid in bullion or pieces of silver, of ten or five crowns value, or smaller pieces by weight; for they have no coin, except some little

pieces of copper.

After six weeks free trade, there is no further communication allowed of between the city of Nangasack and the Dutch in the island of Dinsia, or with the shipping; whereupon the fleet prepares to return, and the factory in Dinsia are confined to their little island again, until the season of the year for traffic returns.

With respect to the character of the Japanese, they are generally very active, and of a quick apprehension and good understanding, modest, patient, and courteous, and excelling all the Orientals in docility. They are so just in their dealings, that one may absolutely depend on their word; and, contrary to the Chinese, disdain to take the least advantage of those they deal with. They are all very industrious and laborious, and much given to study and reading. They affect a surprising neatness and decency in their eating, drinking, furniture, dress, and conversation; and have an abhorrence to intemperance, luxury, and defamation. Drunkenness and gluttony are as much detested by the rich and poor, as cheating and dishonesty. This is the bright side of their character. On the other hand, they are represented as proud, ambitious, cruel, and uncharitable; and so insensible of the miseries of their fellow-creatures, that they will suffer them to perish, rather than relieve them. They are likewise said to be so passionate and revengeful, that they will make away with themselves if they cannot find an opportunity of revenging an affront. They allow not only of polygamy, but also of fornication: but there is still a more heinous and unnatural vice laid to their charge, viz. that of sodomy, which is not only committed with impunity, both by priests and laity, but without either brand or disgrace. In their wars they are very fierce and cruel, seldom giving or asking for quarter; and when a town is taken, they commonly destroy it by fire and sword. Like the Chinese, they are so given to astrology, that they scarce undertake anything of moment, without consulting some pretender to that art. There is a vast number of universities dispersed all over the empire, in which the bonzas preside, richly endowed, finely situated, and accommodated with all the conveniences of life, as well as with large libraries.

The Japanese laws and punishments are severe beyond all justice; and may be justly said, like those of the Spartan Draco, to be written in blood. They have few, if any, written laws, the emperor's will being the supreme one, and next to it that of the kings and princes in their respective dominions. The very lords of every district, and even the heads of every family, have power of life and death over all that are under them, and try and condemn them according to their will. There is scarcely any crime so small, that is not punished with death, except the offender be a petty king or prince, and even these are not always exempted. Every petty larceny, insult, detraction, cheating of any kind, even at play, a lie or prevarication before a magistrate, are all capital, as well as the more heinous crimes of treason, murder, parricide, incest, rape, adultery. Their most common way of putting criminals to death, is by crucifixion with their heads downwards, boiling in oil, tearing them to pieces by horses, or cutting them in pieces by the hangman. For the highest crimes, not only the criminal, but his parents also, brothers, and even children, are all put

to death. The Japanefe have but very little skill in phyfic and furgery. In the cure of difeafes they depcnd much on their medicinal waters, and on certain roots and plants, particularly the root giufeng, brought from China. The operation of blood-letting is performed by pricking the belly with a fine needle, made either of gold or filver. By this acupuncture they not only afuage, but effectually cure, an endemic colicky diforder common among them, and called *fenki*. The other difeafes to which they are moft liable, are the dropfy, diarrhoea, fmall-pox, bloody-flux; but the gout, ftone, and gravel, are hardly known among them.

The Japanefe are much addicted to poetry, mufic, and painting; the firft is faid to be grand as to the ftyle and imagery, lofinelf, and cadence; but, like that of the Chinefe, is not eafily underftood or relifhed by the Europeans. The fame may be faid of their mufic, both vocal and instrumental; the beft of which, of either kind, would hardly be tolerable to a nice European ear. They are better painters than the Chinefe, but much inferior to the Europeans; moft of their performances in that kind, are either in water-colours on paper, fine leather, &c. or in their jappanning and fine porcelain-ware. What is moft to be admired in their paintings, is the fingular beauty of the colours, in many of which they greatly excel us.

They pretend, like the Chinefe, to have been the inventors of printing from time immemorial, and their method is the fame with theirs on wooden blocks; but they excel them in the neatnefs of cutting them, as well as in the goodnefs of their ink and paper. They likewife lay claim to the invention of gunpowder; and are vaftly fuperior to the Chinefe in the ufe of all forts of fire, efpecially of artillery, as well as the curiofity of their fire-works.

Their manner of writing is much the fame as that of the Chinefe, viz. in columns from top to bottom, and the columns beginning at the right and ending at the left hand. Their characters were alfo originally the fame, but now differ confiderably.

Their language hath fome affinity with the Chinefe, though it appears from its various dialects to have been a kind of compound of that and other languages, derived from the various nations that firft peopled thofe iflands. It is not only very regular, polite, elegant, and copious, but abounds with a great variety of fynonima, adapted to the nature of the fubject they are upon, whether fublime, familiar, or low; and to the quality, age, and fex, both of the fpeaker and perfon fpoken to.

The Japanefe are commonly very ingenious in moft handicraft trades; and excel even the Chinefe in feveral manufactures, particularly in the beauty, goodnefs, and variety of their filks, cottons, and other ftuffs, and in their japan and porcelain wares. No eaftern nation comes up to them in the tempering and fabricating of fcymitars, fwords, mufkets, and other fuch weapons.

The Japanefe architecture is much in the fame tafte and ftyle as that of the Chinefe, efpecially as to their temples, palaces, and other public buildings; but in private ones they affect more plainnefs and neatnefs than fhew: thefe laft, being moftly built of wood,

make their cities exceedingly liable to conflagrations, which, wherever they happen, generally reduce the greateft part of them to afhes, they having neither engines nor any other method of ftopping the progrefs of the flames. The gardens about their houfes are adorned with a variety of flowers, trees, verdure, baths, terraces, and other embellifhments. The furniture and decorations of the houfes of perfons of diftinction, confift in japan-work of various colours, curious paintings, beds, couches, fcreens, cabinets, tables, a variety of porcelain jars, vafes, tea-equipage, and other veffels and figures, together with fwords, guns, fcymitars, and other arms. Their retinues are more or lefs numerous and fplendid, according to their rank; but there are few of the lords who have lefs than 50 or 60 men richly clad and armed, fome on foot, but moft on horfeback. As for their petty kings and princes, they are feldom feen without 500 or 200 at leaft, when they either wait on the emperor, which is one half of the year, or attend him abroad. The Japanefe drefs is much like that of the Chinefe, only fomewhat more elegant and neat, and moft commonly of filk or cotton. They wear nothing on their heads either winter or fummer, though they fhave themfelves clofe all over, except one lock, which is left hanging on the top by way of ornament: but to guard themfelves from fun or rain, they always carry an umbrella in one hand; and, if rich enough, have them held over their heads by a fervant. The poorer fort have, inftead of that, either a fan or fhirt fcreen. The women of fafhion, efpecially the young ones, adorn themfelves with flowers, feathers, pearls, &c. but are feldom feen abroad, or even at home, to any but thofe of the family, without a veil.

The proper colour here for feftivals is black, for mourning white. Inftead of rifing at the approach of a fuperior, they fet themfelves down; and inftead of bowing or proftitating when they falute, they ftand upright. They choofe to have their teeth and nails of a fhining black, and to let the latter grow to an exceffive length. The chief food of the Japanefe is rice, pulfe, fruits, roots, herbs, eating very little flefh, and that only of fuch beafts as they take in hunting. Inftead of knives, forks, and fpoons, they make ufe of the fame forts of fmall fticks as the Chinefe. Their common drink is either water or tea; but they have other liquors, fome diftilled from rice or wheat, others made of their grains boiled with fugar or honey, or of fruits, or tapped from the palm, birch, and other trees.

After marriage, the wife is confined to her own apartment, from whence fhe hardly ever ftirs, except once a-year to the funeral-rites of her family; nor is fhe permitted to fee any man, except perhaps fome very near relation, and that as feldom as can be. The wives, as well as in China and other parts of the eaft, bring no portion with them, but are rather bought by the husband of their parents and relations. The bridegroom moft commonly fees his bride for the firft time upon her being brought to his houfe from the place of the nuptial ceremony: for in the temple where it is performed fhe is covered over with a veil, which reaches from the head to the feet. A husband can put his wives to a more or lefs fevere death, if they give him the leaft caufe of jealousy, by being feen barely to converse with

Japanning. another man, or suffering one to come into their apartment.

The Japanese, both poor and rich, make an annual procession to the sepulchres of their dead relations, with songs and music; carrying money, victuals, cloathing, &c. as presents to relieve their various wants in the other world.

When a prince or great man dies, there are commonly about 10, 20, or more youths of his household, and such as were his greatest favourites, who put themselves to a voluntary death, at the place where the body is buried or burned: as soon as the funeral pile, consisting of odoriferous woods, gums, spices, oils, and other ingredients, is set on fire, the relations and friends of the deceased throw their presents into it, such as cloaths, arms, victuals, money, sweet herbs, flowers, and other things which they imagine will be of use to him in the other world. Those of the middle or lower rank commonly bury their dead, without any other burning than that of some odoriferous woods, gums, &c. The sepulchres into which the bones and ashes of persons of rank are deposited, are generally very magnificent, and situated at some distance from the towns.

JAPAN Earth. See *TERRA Japonica*.

JAPANNING, the art of varnishing and drawing figures on wood, in the same manner as is done by the natives of Japan in the East Indies.

The substances which admit of being japanned are almost every kind that are dry and rigid, or not too flexible; as wood, metals, leather, and paper prepared.

Wood and metals do not require any other preparation, but to have their surface perfectly even and clean: but leather should be securely strained either on frames, or on boards; as its bending or forming folds would otherwise crack and force off the coats of varnish: and paper should be treated in the same manner, and have a previous strong coat of some kind of size; but it is rarely made the subject of japanning till it is converted into *papier maché*, or wrought by other means into such form, that its original state, particularly with respect to flexibility, is lost.

One principal variation from the method formerly used in japanning is, the using or omitting any priming or undercoat on the work to be japanned. In the older practice, such priming was always used; and is at present retained in the French manner of japanning coaches and snuff-boxes of the *papier maché*: but in the Birmingham manufacture here, it has been always rejected. The advantage of using such priming or undercoat is, that it makes a saving in the quantity of varnish used; because the matter of which the priming is composed fills up the inequalities of the body to be varnished; and makes it easy, by means of rubbing and water-polishing, to gain an even surface for the varnish: and this was therefore such a convenience in the case of wood, as the giving a hardness and firmness to the ground was also in the case of leather, that it became an established method; and is therefore retained even in the instance of the *papier maché*, by the French, who applied the received method of japanning to that kind of work on its introduction. There is nevertheless this inconvenience always attending the use of an undercoat of size, that the japan coats of varnish and colour

will be constantly liable to be cracked and peeled off by any violence, and will not endure near so long as the bodies japanned in the same manner, but without any such priming; as may be easily observed in comparing the wear of the Paris and Birmingham snuff-boxes; which latter, when good of their kind, never peel or crack, or suffer any damage, unless by great violence, and such a continued rubbing as wastes away the substance of the varnish; while the japan coats of the Parisian crack and fly off in flakes, whenever any knock or fall, particularly near the edges, exposes them to be injured. But the Birmingham manufacturers, who originally practised the japanning only on metals, to which the reason above given for the use of priming did not extend, and who took up this art of themselves as an invention, of course omitted at first the use of any such undercoat; and not finding it more necessary in the instance of *papier maché*, than on metals, continue still to reject it. On which account, the boxes of their manufacture are, with regard to the wear, greatly better than the French.

The laying on the colours in gum-water, instead of varnish, is also another variation from the method of japanning formerly practised: but the much greater strength of the work, where they are laid on in varnish or oil, has occasioned this way to be exploded with the greatest reason in all regular manufactures: however, they who may practise japanning on cabinets, or other such pieces as are not exposed to much wear and violence, for their amusement only, and consequently may not find it worth their while to encumber themselves with the preparations necessary for the other methods, may paint with water-colours on an undercoat laid on the wood, or other substance of which the piece to be japanned is formed; and then finish with the proper coats of varnish, according to the methods below taught: and if the colours are tempered with the strongest isinglass size and honey, instead of gum-water, and laid on very flat and even, the work will not be much inferior in appearance to that done by the other method, and will last as long as the old japan.

Of JAPAN Grounds.—The proper grounds are either such as are formed by the varnish and colour, where the whole is to remain of one simple colour; or by the varnish either coloured, or without colour, on which some painting or other decoration is afterwards to be laid. It is necessary, however, before we proceed to speak of the particular grounds, to shew the manner of laying on the priming or undercoat, where any such is used.

This priming is of the same nature with that called *clear-coating*, or vulgarly *clear-coaling*, practised erroneously by the *houle*-painters; and consists only in laying on and drying in the most even manner, a composition of size and whitening, or sometimes lime instead of the latter. The common size has been generally used for this purpose: but where the work is of a nicer kind, it is better to employ the glover's or the parchment size; and if a third of isinglass be added, it will be still better, and, if not laid on too thick, much less liable to peel and crack. The work should be prepared for this priming, by being well smoothed with the fish-skin or glass-shaver; and, being made thoroughly clean, should be brushed over once or twice with

anning. with hot size, diluted with two thirds of water, if it be of the common strength. The priming should then be laid on with a brush as even as possible; and should be formed of a size, whose confidence is betwixt the common kind and glue, mixed with as much whiting as will give it a sufficient body of colour to hide the surface of whatever it is laid upon, but not more.

If the surface be very clean, on which the priming is used, two coats of it, laid on in this manner, will be sufficient; but if, on trial with a fine rag wet, it will not receive a proper water polish, on account of any inequalities not sufficiently filled up and covered, two or more coats must be given it; and whether a greater or less number be used, the work should be smoothed, after the last coat but one is dry, by rubbing it with the Dutch rushes. When the last coat is dry, the water polish should be given, by passing over every part of it with a fine rag gently moistened, till the whole appear perfectly plain and even. The priming will then be completed, and the work ready to receive the painting or coloured varnish; the rest of the proceedings being the same in this case as where no priming is used.

When wood or leather is to be japanned, and no priming is used, the best preparation is to lay two or three coats of coarse varnish composed in the following manner:

“ Take of rectified spirit of wine one pint, and of coarse feed-lac and resin each two ounces. Dissolve the feed-lac and resin in the spirit; and then strain off the varnish.”

This varnish, as well as all others formed of spirit of wine, must be laid on in a warm place; and, if it can be conveniently managed, the piece of work to be varnished should be made warm likewise: and for the same reason all dampness should be avoided; for either cold or moisture chills this kind of varnish, and prevents its taking proper hold of the substance on which it is laid.

When the work is so prepared, or by the priming with the composition of size and whiting above described, the proper japan ground must be laid on, which is much the best formed of shell-lac varnish, and the colour desired, if white be not in question, which demands a peculiar treatment; or great brightness be not required, when also other means must be pursued.

The colours used with the shell-lac varnish may be any pigments whatever which give the tint of the ground desired; and they may be mixed together to form browns or any compound colours.

As metals never require to be undercoated with whiting, they may be treated in the same manner as wood or leather, when the under-coat is omitted, except in the instances particularly spoken of below.

White JAPAN Grounds.—The forming a ground perfectly white, and of the first degree of hardness, remains hitherto a desideratum, or matter sought for, in the art of japanning, as there are no substances which form a very hard varnish, but what have too much colour not to deprave the whiteness, when laid on of a due thickness over the work.

The nearest approach, however, to a perfect white varnish, already known, is made by the following composition.

“ Take flake white, or white lead, washed over and ground up with a sixth of its weight of starch, and then

dried; and temper it properly for spreading with the Japanning mastic varnish prepared as under the article VARNISH.

“ Lay these on the body to be japanned, prepared either with or without the under-coat of whiting, in the manner as above ordered; and then varnish it over with five or six coats of the following varnish:

“ Provide any quantity of the best feed-lac; and pick out of it all the clearest and whitest grains, reserving the more coloured and fouler parts for the coarse varnishes, such as that used for priming or preparing wood or leather. Take of this picked feed-lac two ounces, and of gum-animi three ounces; and dissolve them, being previously reduced to a gross powder, in about a quart of spirit of wine; and strain off the clear varnish.”

The feed-lac will yet give a slight tinge to this composition; but cannot be omitted where the varnish is wanted to be hard; though, when a softer will answer the end, the proportion may be diminished, and a little crude turpentine added to the gum-animi to take off the bitterness.

A very good varnish, free entirely from all bitterness, may be formed by dissolving as much gum-animi as the oil will take, in old nut or poppy oil; which must be made to boil gently when the gum is put into it. The ground of white colour itself may be laid on in this varnish, and then a coat or two of it may be put over the ground; but it must be well diluted with oil of turpentine when it is used. This, though free from brittleness, is nevertheless liable to suffer by being indented or bruised by any slight strokes; and it will not well bear any polish, but may be brought to a very smooth surface without, if it be judiciously managed in the laying it on. It is likewise somewhat tedious in drying, and will require some time where several coats are laid on; as the last ought not to contain much oil of turpentine.

Blue JAPAN Grounds.—Blue japan grounds may be formed of bright Prussian blue, or of verditer glazed over by Prussian blue, or of smalt. The colour may be best mixed with shell-lac varnish, and brought to a polishing state by five or six coats of varnish of feed-lac: but the varnish, nevertheless, will somewhat injure the colour by giving to a true blue a cast of green, and fouling in some degree a warm blue by the yellow it contains: where, therefore, a bright blue is required, and a less degree of hardness can be dispensed with, the method before directed in the case of white grounds must be pursued.

Red JAPAN Grounds.—For a scarlet japan ground, vermilion may be used: but the vermilion has a glaring effect, that renders it much less beautiful than the crimson produced by glazing it over with carmine or fine lake; or even with rose-pink, which has a very good effect used for this purpose. For a very bright crimson, nevertheless, instead of glazing with carmine, the Indian lake should be used, dissolved in the spirit of which the varnish is compounded, which it readily admits of when good: and, in this case, instead of glazing with the shell-lac varnish, the upper or polishing coats need only be used; as they will equally receive and convey the tinge of the Indian lake, which may be actually dissolved by spirit of wine: and this will be found a much cheaper method than the using carmine. If, nevertheless, the highest degree of brightness be re-

Japanning. quired, the white varnishes must be used.

Yellow JAPAN Grounds.—For bright yellow grounds, the king's yellow, or the turpeth mineral, should be employed, either alone or mixed with fine Dutch pink; and the effect may be still more heightened by dissolving powdered turmeric-root in the spirit of wine of which the upper or polishing coat is made; which spirit of wine must be strained from off the dregs, before the feed-lac be added to it to form the varnish.

The feed-lac varnish is not equally injurious here, and with greens, as in the case of other colours; because, being only tinged with a reddish yellow, it is little more than an addition to the force of the colours.

Yellow grounds may be likewise formed of the Dutch pink only; which, when good, will not be wanting in brightness, though extremely cheap.

Green JAPAN Grounds.—Green grounds may be produced by mixing the king's yellow and bright Prussian blue, or rather the turpeth mineral and Prussian blue; and a cheap, but fouler kind, by verdigrise with a little of the abovementioned yellows, or Dutch pink. But where a very bright green is wanted, the crystals of verdigrise, called *distilled verdigrise*, should be employed; and to heighten the effect, they should be laid on a ground of leaf-gold, which renders the colour extremely brilliant and pleasing.

They may any of them be used successfully with good feed-lac varnish, for the reason before given; but will be still brighter with white varnish.

Orange-coloured JAPAN Grounds.—Orange-coloured japan grounds may be formed by mixing vermilion or red-lead with king's yellow, or Dutch pink; or the orange-lake, which will make a brighter orange ground than can be produced by any mixture.

Purple JAPAN Grounds.—Purple japan grounds may be produced by the mixture of lake and Prussian blue; or a fouler kind, by vermilion and Prussian blue. They may be treated as the rest, with respect to the varnish.

Black JAPAN Grounds to be produced without Heat.—Black grounds may be formed by either ivory-black, or lamp-black: but the former is preferable, where it is perfectly good.

These may be always laid on with shell-lac varnish; and have their upper or polishing coats of common feed-lac varnish, as the tinge or foulness of the varnish can be here no injury.

Common black JAPAN Grounds on Iron or Copper, produced by means of Heat.—For forming the common black japan grounds by means of heat, the piece of work to be japanned must be painted over with drying oil; and, when it is of a moderate dryness, must be put into a stove of such degree of heat as will change the oil black, without burning it so as to destroy or weaken its tenacity. The stove should not be too hot when the work is put into it, nor the heat increased too fast; either of which errors would make it blister; but the slower the heat is augmented, and the longer it is continued, provided it be restrained within the due degree, the harder will be the coat of japan. This kind of varnish requires no polish, having received, when properly managed, a sufficient one from the heat.

The fine Tortoise-shell JAPAN Ground, produced by means of Heat.—The best kind of tortoise-shell ground

produced by heat is not less valuable for its great hardness, and enduring to be made hotter than boiling water without damage, than for its beautiful appearance. It is to be made by means of a varnish prepared in the following manner:

"Take of good linseed-oil one gallon, and of umbre half-a-pound: boil them together till the oil become very brown and thick: strain it then through a coarse cloth, and set it again to boil; in which state it must be continued till it acquire a pitchy consistence; when it will be fit for use."

Having prepared thus the varnish, clean well the iron or copper plate, or other piece which is to be japanned; and then lay vermilion tempered with shell-lac varnish, or with drying oil diluted with oil of turpentine, very thinly, on the places intended to imitate the more transparent parts of the tortoise-shell. When the vermilion is dry, brush over the whole with the black varnish, tempered to a due consistence with oil of turpentine; and when it is set and firm, put the work into a stove, where it may undergo a very strong heat, and must be continued a considerable time; if even three weeks or a month, it will be the better.

This was given amongst other receipts by Kunkel; but appears to have been neglected till it was revived with great success in the Birmingham manufactures, where it was not only the ground of snuff-boxes, dressing-boxes, and other such lesser pieces, but of those beautiful tea-waiters which have been so justly esteemed and admired in several parts of Europe where they have been sent. This ground may be decorated with painting and gilding, in the same manner as any other varnished surface, which had best be done after the ground has been duly hardened by the hot stove; but it is well to give a second annealing with a more gentle heat after it is finished.

Method of painting JAPAN Work.—Japan work ought properly to be painted with colours in varnish; though, in order for the greater dispatch, and, in some very nice works in small, for the freer use of the pencil, the colours are sometimes tempered in oil; which should previously have a fourth part of its weight of gum-animi dissolved in it; or, in default of that, of the gums sandarac or mastic. When the oil is thus used, it should be well diluted with spirit of turpentine, that the colours may be laid more evenly and thin; by which means, fewer of the polishing or upper-coats of varnish become necessary.

In some instances, water-colours are laid on grounds of gold, in the manner of other paintings; and are best, when so used, in their proper appearance, without any varnish over them; and they are also sometimes managed as to have the effect of embossed work. The colours employed in this way, for painting, are best prepared by means of isinglass size corrected with honey or sugar-candy. The body of which the embossed work is raised, need not, however, be tinged with the exterior colour; but may be best formed of very strong gum-water, thickened to a proper consistence by bole-armenian and whitening in equal parts; which being laid on in the proper figure, and repaired when dry, may be then painted with the proper colours tempered in the isinglass size, or in the general manner with shell-lac varnish.

Manner of Varnishing JAPAN Work.—The last and finishing part of japanning lies in the laying on and polishing the outer coats of varnish; which are necessary, as well in the pieces that have only one simple ground of colour, as with those that are painted. This is in general best done with common feed-lac varnish, except in the instances and on those occasions where we have already shewn other methods to be more expedient: and the same reasons which decide as to the fitness or impropriety of the varnishes, with respect to the colours of the ground, hold equally with regard to those of the painting: for where brightness is the most material point, and a tinge of yellow will injure it, feed-lac must give way to the whiter gums; but where hardness, and a greater tenacity, are most essential, it must be adhered to; and where both are so necessary, that it is proper one should give way to the other in a certain degree reciprocally, a mixed varnish must be adopted.

This mixed varnish, as we have already observed, should be made of the picked feed-lac. The common feed-lac varnish, which is the most useful preparation of the kind hitherto invented, may be thus made:

“Take of feed-lac three ounces, and put it into water to free it from the sticks and filth that are frequently intermixed with it; and which must be done by stirring it about, and then pouring off the water, and adding fresh quantities in order to repeat the operation, till it be freed from all impurities, as it very effectually may be by this means. Dry it then, and powder it grossly, and put it, with a pint of rectified spirit of wine, into a bottle, of which it will not fill above two-thirds. Shake the mixture well together; and place the bottle in a gentle heat, till the feed appear to be dissolved; the shaking being in the mean time repeated as often as may be convenient: and then pour off all that can be obtained clear by this method, and strain the remainder through a coarse cloth. The varnish thus prepared must be kept for use in a bottle well stopp’d.”

When the spirit of wine is very strong, it will dissolve a greater proportion of the feed-lac: but this will saturate the common, which is seldom of a strength sufficient for making varnishes in perfection. As the chilling, which is the most inconvenient accident attending those of this kind, is prevented, or produced more frequently, according to the strength of the spirit; we shall therefore take this opportunity of shewing a method by which weaker rectified spirits may with great ease, at any time, be freed from the phlegm, and rendered of the first degree of strength.

“Take a pint of the common rectified spirit of wine, and put it into a bottle, of which it will not fill above three parts. Add to it half an ounce of pearl-ashes, salt of tartar, or any other alkaline salt, heated red-hot, and powdered, as well as it can be without much loss of its heat. Shake the mixture frequently for the space of half an hour; before which time, a great part of the phlegm will be separated from the spirit, and will appear, together with the undissolved part of the salts, in the bottom of the bottle. Let the spirit then be poured off, or freed from the phlegm and salts, by means of a tritiorium or separating funnel;

and let half an ounce of the pearl-ashes, heated and powdered as before, be added to it, and the same treatment repeated. This may be done a third time, if the quantity of phlegm separated by the addition of the pearl-ashes appear considerable. An ounce of alum reduced to powder and made hot, but not burnt, must then be put into the spirit, and suffered to remain some hours; the bottle being frequently shaken: after which, the spirit, being poured off from it, will be fit for use.”

The addition of the alum is necessary, to neutralize the remains of the alkaline salt or pearl-ashes; which would otherwise greatly deprave the spirit with respect to varnishes and lacquer, where vegetable colours are concerned; and must consequently render another distillation necessary.

The manner of using the feed-lac or white varnishes is the same, except with regard to the substance used in polishing; which, where a pure white or great clearness of other colours is in question, should be itself white: whereas the browner sorts of polishing dust, as being cheaper, and doing their business with greater dispatch, may be used in other cases. The pieces of work to be varnished should be placed near a fire, or in a room where there is a store, and made perfectly dry; and then the varnish may be rubbed over them by the proper brushes made for that purpose, beginning in the middle, and passing the brush to one end; and then with another stroke from the middle, passing it to the other. But no part should be crossed or twice passed over, in forming one coat, where it can possibly be avoided. When one coat is dry, another must be laid over it; and this must be continued at least five or six times, or more, if on trial there be not a sufficient thickness of varnish to bear the polish, without laying bare the painting or the ground colour underneath.

When a sufficient number of coats is thus laid on, the work is fit to be polished: which must be done, in common cases, by rubbing it with a rag dipped in Tripoli or pumice-stone, commonly called *rotten stone*, finely powdered: but towards the end of the rubbing, a little oil of any kind should be used along with the powder; and when the work appears sufficiently bright and glossy, it should be well rubbed with the oil alone, to clean it from the powder, and give it a still brighter lustre.

In the case of white grounds, instead of the Tripoli or pumice-stone, fine putty or whiting must be used; both which should be washed over to prevent the danger of damaging the work from any sand or other gritty matter that may happen to be commixed with them.

It is a great improvement of all kinds of japan work, to harden the varnish by means of heat; which, in every degree that it can be applied short of what would burn or calcine the matter, tends to give it a more firm and strong texture. Where metals form the body, therefore, a very hot stove may be used, and the pieces of work may be continued in it a considerable time; especially if the heat be gradually increased: but where wood is in question, heat must be sparingly used, as it would otherwise warp or shrink the body, so as to injure the general figure.

Jaquelot

Jaher.

JAQUELOT (Isaac), a celebrated French Protestant divine, born in 1647 at Vally in Champagne, where his father was minister. The revocation of the edict of Nantz obliging him to quit France, he took refuge first at Heidelberg, and then at the Hague, where he procured an appointment in the Walloon church. Here he continued till that capital was taken by the king of Prussia, who, hearing him preach, made him his French minister in ordinary at Berlin; to which city he removed in 1702. While he lived at Berlin, he entered into a warm controversy with M. Bayle on the doctrine advanced in his dictionary favouring manichæism, which continued until death imposed silence on both parties: and it was in this dispute that M. Jaquelot openly declared in favour of the Remonstrants. He wrote, among other works, 1. *Dissertations sur l'existence de Dieu*. 2. *Dissertations sur le Messie*. 3. *Lettres à Messieurs les Prelats de l'Eglise Gallicane*. He was employed in finishing an important work upon the divine authority of the holy scriptures, when he died suddenly, in 1708, aged 61.

JAR, or **JARR**, an earthen pot or pitcher, with a big belly and two handles.—The word comes from Spanish *jarra*, or *jarro*, which signify the same.

JAR is used for a sort of measure or fixed quantity of divers things.—The jar of oil is from 18 to 26 gallons; the jar of green ginger, is about 100 pound weight.

JARCHI (Solomon), otherwise *Raschi* and *Isaaki Solomon*, a famous rabbi, born at Troyes in Champagne, who flourished in the 12th century. He was a perfect master of the talmud and gemara; and he filled the postils of the bible with so many talmudical reveries, as totally extinguished both the literal and moral sense of it. A great part of his commentaries are printed in Hebrew, and some have been translated into Latin by the Christians. They are all greatly esteemed by the Jews, who have bestowed on the author the title of *prince of commentators*.

JARIMUTH, **JARMUTH**, or *Jerimoth*, Josh. xv. a town reckoned to the tribe of Judah, four miles from Eleutheropolis, westward, (Jerome). Thought to be the same with Ramoth and Remeth, Joshua xix. and Nehem. x. 2. (Reland).

JARNAC, a town of France, in Orleanois and in Angumois, remarkable for a victory gained by Henry III. over the Huguenots in 1569. It is seated on the river Charente, in W. Long. o. 13. N. Lat. 45. 40.

JAROSLOW, a handsome town of Poland, in the palatinate of Russia, with a strong citadel. It is remarkable for its great fair, its handsome buildings, and a battle gained by the Swedes in 1656, after which they took the town. It is seated on the river Saine, in E. Long. 22. 23. N. Lat. 49. 58.

JASHER (The book of). This is a book which Joshua mentions, and refers to, in the following passage: "And the sun stood still, and the moon stayed, until the people had avenged themselves upon their enemies: is not this written in the book of Jasher?"

It is difficult to determine what this book of *Jasher*, or "the upright," is. St Jerom and the Jews believed it to be Genesis, or some other book of the Pentateuch, wherein God foretold he would do wonderful things in favour of his people. Huetius sup-

poses it was a book of morality, in which it was said that God would subvert the course of nature in favour of those who put their trust in him. Others pretend, it was public annals, or records, which were styled *justice* or *upright*, because they contained a faithful account of the history of the Israelites. Grotius believes, that this book was nothing else but a song, made to celebrate this miracle and this victory. This seems the more probable opinion, because the words cited by Joshua as taken from this work, "Sun, stand thou still upon Gibeon, and thou moon in the valley of Ajalon," are such poetical expressions as do not suit with historical memoirs; besides that in the 2d book of Samuel (i. 18.) mention is made of a book under the same title, on account of a song made on the death of Saul and Jonathan.

JASMINE. See **JASMINUM**.

Arabian JASMINE. See **NYCTANTHES**.

JASMINUM, **JASMINE**, or *Jessamine-tree*; a genus of the monogynia order, belonging to the dianthia class of plants.

Species. 1. The officialis, or common white jasmine, hath shrubby long slender stalks and branches, rising upon support 15 or 20 feet high, with numerous white flowers from the joints and ends, of a very fragrant odour. There is a variety with white-striped, and another with yellow-striped leaves. 2. The fruticans, or shrubby yellow jasmine, hath shrubby, angular, trailing stalks and branches, rising upon support eight or ten feet high; trifoliate and simple alternate leaves; with yellow flowers from the sides and ends of the branches, appearing in June; frequently producing berries of a black colour. This species is remarkable for sending up many suckers from its roots; often so plentifully as to overspread the ground, if not taken up annually. 3. The humilis, or dwarf yellow jasmine, hath shrubby firm stalks, and angular branches, of low, somewhat robust and bushy growth; broad, trifoliate, and pinnated leaves; and large yellow flowers in July, sometimes succeeded by berries. 4. The grandiflorum, or great-flowered Catalonian jasmine, hath a shrubby firm upright stem, branching out into a spreading head from about three to six or eight feet high, with large flowers of a bluish-red colour without, and white within, appearing from July to November. Of this there is a variety with semi-double flowers, having two series of petals. 5. The azoricum, or azorian white jasmine, hath shrubby, long slender stalks and branches, rising upon support 15 or 20 feet high, with pretty large flowers of a pure white colour; coming out in loose bunches from the ends of the branches, and appearing most part of the summer and autumn. 6. The odoratissimum, or most sweet-scented yellow Indian jasmine, hath a shrubby upright stalk branching erect, without support, six or eight feet high, with bright yellow flowers in bunches from the ends of the branches; flowering from July till October, and emitting a most fragrant odour.

Culture. The three first species are sufficiently hardy to thrive in this climate without any shelter. They may be easily propagated by layers and cuttings; and the striped varieties by grafting or budding on stocks of the common kind.—The other three species, which are tender, may also be increased by layers, or seeds,

Jasmine,

jasminum

seeds, or by grafting and budding them upon the common white and shrubby yellow jafmine. They require shelter in a green-house in winter, and therefore must always be kept in pots to move them out and in occasionally. The pots must be filled with light, rich earth, frequently watered in summer, and about once a week in winter, but always moderately during that season. Prune off all the decayed wood at any time when it appears, and shorten or retrench the rambling shoots as you see occasion, to preserve the heads somewhat regular; managing them in other respects as the common green-house plants.

JASON, the Greek hero who undertook the Argonautic expedition, the history of which is obscured by fabulous traditions, flourished about 937 B. C.

JASPER, in natural history, a genus of scrupi, of a complex irregular structure, of a great variety of colours, and emulating the appearance of the finer marbles, or semipellucid gems.

The great characteristic of jaspers is, that they all readily strike fire with steel, and make not the least effervescence with aquafortis.

Jaspers, though commonly reckoned among the precious stones, ought undoubtedly to be ranged among the scrupi; being only opaque crystalline masses, variously debased with an earthy admixture; and to this last ingredient it is that they owe all their variety of colours, as white, green, red, brown, and bluish.

The several kinds of nephritic stone, and the lapis divinus or jade, are all genuine jaspers; but the hard, bright, green jasper of the East Indies, seems to be the true kind. It is found in masses of various sizes and shapes: but the more usual standard as to size is between four and six inches in diameter; tho' there are masses of it found of a foot or more in diameter, and others no larger than a horse-bean. It is generally simple and unmixed: but if it be variegated at all, it is always with white; and this is disposed not in streaks or veins, but in clouds. It is capable of a very fine polish; and, when the white clouds are well disposed, is very beautiful; and, in pieces not too thick, is tolerably pellucid when held up against the light.

JASPONYX, in natural history, the purest horn coloured onyx, with beautiful green zones, which are composed of the genuine matter of the finest jaspers. See JASPER and GONYX.

JATROPHA, the CASSADA-PLANT; a genus of the monoclephia order, belonging to the monoclephia class of plants. There are seven species; the most remarkable of which is the manihot or manioc, the root of which is naturally poisonous, but may be deprived of that quality, and made into bread; and as such is used both in Africa and America, though it hath been disputed whether the plant is really a native of the latter country, or imported to it from Africa. The shrub rises seven or eight feet high, with a thin bark, that is grey, red, or violet, according to the different colours of the wood which it covers. The trunk and branches are filled with small prominences or knots, exhibiting the vestigia of the fallen leaves; for as the tree increases in height, the leaves relinquish the bottom of the branches, and are only to be found near the top. The wood is soft and brittle. The plant is better propagated by layers than from seed; at least,

little of the root proper for eating is to be obtained by the latter method. The principal root produces suckers, in number from four to seven, and of different length and thickness, according to the age of the tree and goodness of the soil. The bark of the roots is like that of the trunk, grey, when the wood is grey; red, when red; white, when white: but the inside or heart is always white, and of the consistence of turnip.

The roots of white manioc are ripe in eight months; those of the other kind require 14 or 18 months to attain their full size and maturity. When ripe, they are plucked out of the earth by tearing up the whole tree, which never fails to be accompanied by the root; and if in that operation any of the offsets should be separated from the main root, which is easily observed, they take them up with a hoe. It requires no great force to pluck up these shrubs; for, besides that the soil is of a soft nature, the roots do not penetrate very deep into it.

When plucked up, the negroes destined for this work grate or rasp the bark with a blunt knife, as is done to turnips, and then throw them into a tub full of water. They are then reduced to a powder or meal, resembling the coarse sawings of wood: this is effected by rubbing the root very forcibly against a copper file or grater, about 15 or 18 inches long, and 10 or 12 broad, that is fastened by small nails upon a plank of timber, three feet and a half long and one broad. The negro, who files, puts one end of the plank into a wooden trough or tub, and holds the other against his stomach; at his side is a basket, containing roots that are rasped, washed, and fit for being filed; one of these he takes in each hand, and passes it violently upon the file or grater, till it is reduced to a rough powder.

All the roots being grated in this manner, they take the powder and put it into a press, with a view to squeeze out the juice, which is regarded as a very strong poison, not only for men, but for beasts also, who drink of it, or chance to eat of these roots before the juice is expressed. It is remarkable, that animals which die in consequence of having swallowed any quantity of this substance, have their breasts prodigiously swelled, without any visible alteration on the noble parts. Some have hence argued, that the juice in question is not essentially a poison; but that possessing a superfluity of nourishment, it proves an overmatch to the digestive faculties, and thus proves mortal.

Besides this super-abundance of nourishment, says father Labat, a part of its malignity consists in its coldness, which stops the circulation, benumbs the animal-spirits, and at length causes death: hence the best antidote against this poison is heat and violent motion. The patient, after swallowing large quantities of oil, to excite a nausea and vomiting, is made to run as quick as he can, and drink plentifully of the strongest spirits; in fine, every method is used to excite violent heat, to rouse the spirits, and put the blood in motion.

Animals which have accustomed themselves insensibly to the juice of manioc, feel no inconvenience from the root of it, but rather the contrary. It is in this manner that the Turks, by a gradual and constant use,

use, have rendered opium a harmless and even exhilarating medicine.

The juice of manioc loses its malignity when heated. The natives of the West-Indies, who use it in all their sauces, feel no sort of inconvenience from it, because they never use it till after being boiled. Of the same juice they make starch, by drying it in the sun, where it becomes as white as snow, and is frequently made into cakes, which are as delicate as if made with the finest wheat-flour.

When the manioc is sufficiently pressed, they either make it into bread, called *caffada*, or into flour for preserving. For the first-mentioned purpose, they have a plate of iron, two feet broad and half an inch thick; this they place upon a tripod, or on stones, and kindle a fire below it. When sufficiently heated, so as not to admit of the touch, they lay on the whole surface about the thickness of three fingers of manioc, which has been previously pressed and sifted. The heap falls down in proportion as it roasts, and the parts join and incorporate. This compression and incorporation is aided by the person who roasts, slightly passing a piece of wood over the plate. When the side of the cake next the plate is sufficiently done, that is, adheres, and the colour, formerly very white, becomes red, it is turned; and the other side allowed to roast till the same symptoms appear. When roasted, it is laid in the sun for two or three hours, with a view to dissipate any poisonous humidity, which may still lurk in the root under this new form.

The inside of *caffada* is as white as snow, the sides of a pale gold colour; the substance, which is very nourishing, and of easy digestion, may be preserved seven or eight months, or more, provided it is kept dry and sometimes exposed to the sun. When dipped in water, or put in soup, *caffada* swells up to a great height, which seems to prove its great abundance in substance.

The other mode of preparation, however, is most common, as being more convenient for preserving, distributing to the negroes, and transporting from place to place. The manioc, in this case, is put into a pan or stove that is but slightly heated, where it is continually turned, like coffee-beans, with a small wooden instrument contrived for that purpose. This motion prevents it from sticking to the pan; so that, when dried and roasted, it has the appearance of thick red grains of salt. This mode of preparation is much more expeditious than the former. When dried, it is put in granaries, where it may be preserved whole years, if kept dry, or put into a stove every six months.

This substance may be eat quite dry, as crumbled bread, or as the Turks eat roasted rice. When moistened, it swells prodigiously.

This latter method of preparing manioc is never practised by the natives, who use only *caffada*, which they prepare once every day, or oftener, as occasion requires; for they eat it quite hot, as being then more delicate and agreeable to the taste. Before their intercourse with the Europeans had procured them iron plates, they made their *caffada* upon large flat stones, whose thickness they adjusted to that purpose. In default of copper files or grates, they made use of a plank of wood, in which were fixed very small sharp bits of

pebbles.

One sort of manioc is said to be exempt from the poisonous quality possessed by the juice of the others. It is called *camoniac*, that is, chief of manioc: in fact, its wood, leaves, and roots, are larger and thicker than the others, and it is eaten without danger, or any precaution; but as it is longer of growing and ripening, and the roots yield much less meal, because lighter and more spongy, it is generally neglected.

The small bits of manioc which have escaped the grater, and the clods which have not passed the sieve, are not useless. They are dried in the stove after the flour is roasted, and then pounded in a mortar to a fine white powder, with which they make soup. It is likewise used for making a kind of thick coarse *caffada*, which is roasted till almost burnt; of this, fermented with molasses and West-India potatoes, they prepare a much esteemed drink or beverage called *ouycou*. This liquor, the favourite drink of the natives, is sometimes made extremely strong, especially on any great occasion, as a feast; with this they get intoxicated, and, remembering their old quarrels, massacre and murder each other. Such of the inhabitants and workmen as have not wine, drink *ouycou*. It is of a red colour, strong, nourishing, refreshing, and easily inebriates the inhabitants, who soon accustom themselves to it as easily as beer. The leaves of manioc are used in both Indies, as those of spinnage are with us.

JAVA, a large island of the East Indies, lying between 105° and 116° E. Long. and from 6° to 8° S. Lat. extending in length 700 miles, and in breadth about 100. It is situated to the south of Borneo, and south-east from the peninsula of Malacca, having Sumatra lying before it, from which it is separated by a narrow passage, now so famous in the world by the name of the *Straits of Sunda*. The country is mountainous and woody in the middle; but a flat coast, full of bogs and marshes, renders the air unhealthful. It produces pepper, indigo, sugar, tobacco, rice, coffee, cocoa-nuts, plantains, cardamoms, and other tropical fruits. Gold also, but in no great quantities, hath been found in it. It is diversified by many mountains, woods, and rivers; in all which nature has very bountifully bestowed her treasures. The mountains are many of them so high as to be seen at the distance of three or four leagues. That which is called the *Blue Mountain* is by far the highest of them all, and seen the farthest off at sea. They have frequent and very terrible earthquakes in this island, which shake the city of Batavia and places adjacent, to such a degree, that the fall of the houses is expected every moment. The waters in the road are excessively agitated, inasmuch that their motion resembles that of a boiling pot; and in some places the earth opens, which affords a strange and terrible spectacle. The inhabitants are of opinion, that these earthquakes proceed from the mountain Parang, which is full of sulphur, saltpetre, and bitumen. The fruits and plants of this island are all in their several kinds excellent, and almost out of number. There are abundance of forests scattered over it, in which are all kinds of wild beasts, such as buffaloes, tigers, rhinoceroses, and wild horses, with an infinite variety of serpents, some of them of an enormous size. Crocodiles are prodigiously large in Java, and are found chiefly

chiefly the mouths of rivers; for, being amphibious animals, they delight mostly in marshes and savannahs. This creature, like the tortoise, lays its eggs in the hot sands, without taking any further care of them; and the sun hatches them at the proper season, when they run instantly into the water. There is, in short, no kind of animal wanting here: fowls they have of all sorts, and exquisitely good, especially peacocks, partridges, pheasants, wood-pigeons: and, for curiosity, they have the Indian bat, which differs little in form from ours; but its wings, when extended, measure a full yard, and the body of it is of the size of a rat. They have fish in great plenty, and very good; so that for the value of three-pence there may be enough bought to dine six or seven men. They have likewise a multitude of tortoises, the flesh of which is very little inferior to veal, and there are many who think it better.

It is said, that there are in the island upwards of 40 great towns, which, from the number of their inhabitants, would, in any other part of the world, merit the title of *cities*; and more than 4,500 villages, besides hamlets, and straggling houses, lying very near each other, upon the sea-coast, and in the neighbourhood of great towns: so that, upon a fair and moderate computation, there are within the bounds of the whole island, taking in persons of both sexes, and of all ranks and ages, more than thirty millions of souls; so that it is thrice as populous as France, which, though twice as big, is not computed to have more than twenty millions of inhabitants.

There are a great many princes in the island, of which the most considerable are, the emperor of Mataran, who resides at Katsafura, and the kings of Bantam and Japara. Upon the first of these many of the petty princes are dependant; but the Dutch are absolute masters of the greatest part of the island, particularly of the north coast, though there are some of the princes beyond the mountains, on the south coast, who still maintain their independency. The natives of the country, who are established in the neighbourhood of Batavia, and for a tract of about 40 leagues along the mountains of the country of Bantam, are immediately subject to the governor-general. The company send drovers, or commissaries, among them, who administer justice and take care of the public revenues.

The city of Batavia is the capital not only of this island, but of all the Dutch dominions in India. It is an exceeding fine city, situated in the latitude of 6° south, at the mouth of the river Jucatra, and in the bosom of a large commodious bay, which may be considered not only as one of the safest harbours in India, but in the world. The city is surrounded by a rampart, 21 feet thick, covered on the outside with stone, and fortified with 22 bastions. This rampart is environed by a ditch 45 yards over, and full of water, especially when the tides are high, in the spring. The avenues to the town are defended by several forts, each of which is well furnished with excellent brass cannon: no person is suffered to go beyond these forts without a passport. The river Jucatra passes through the midst of the town, and forms 15 canals of running water, all faced with free-stone, and adorned with trees that are ever green: over these canals are

56 bridges, besides those which lie without the town. The streets are all perfectly straight, and each, generally speaking, 30 feet broad. The houses are built of stone, after the manner of those in Holland. The city is about a league and a half in circumference, and has five gates; but there are ten times the number of houses without that there are within it. There is a very fine town-house, four Calvinist churches, besides other places of worship for all sorts of religions, a spin-huys or house of correction, an orphan-house, a magazine of sea-stores, several for spices, with wharfs and cord-manufactures, and many other public buildings. The garrison consists commonly of between 2000 and 3000 men. Besides the forts mentioned above, there is the citadel of Batavia, a very fine regular fortification, situated at the mouth of the river, and flanked with four bastions; two of which command the sea, and the other two the town. It is in this citadel that the governor-general of the Indies has his palace; over-against which is that of the director-general, who is the next person to the governor. The counsellors, and other principal officers of the company, have also their apartments there; as have likewise the physician, the surgeon, and the apothecary. There are in it, besides, arsenals and magazines, furnished with ammunition for many years. The city of Batavia is not only inhabited by Dutch, French, Portuguese, and other Europeans, established here on account of trade; but also by a vast number of Indians of different nations, Javanese, Chinese, Malaysians, Negroes, Amboynese, Armenians, natives of the isle of Bali, Mardiykers or Topasses, Macassers, Timors, Bougis, &c. Of the Chinese, there are, it is said, about 100,000 in the island; of which, near 30,000 resided in the city till the year 1740, when the Dutch, pretending that they were in a plot against them, sent a body of troops into their quarter, and demanded their arms, which the Chinese readily delivered up; and the next day the governor sent another body, with orders to murder and massacre every one of the Chinese, men, women, and children. Some relate there were 20,000, others 30,000, that were put to death, without any manner of trial: and yet the barbarous governor, who was the instrument of this cruel proceeding, had the assurance to embark for Europe, imagining he had amassed wealth enough to secure him against any prosecution in Holland; but the Dutch, finding themselves detected and abhorred by all mankind for this piece of tyranny, endeavoured to throw the odium of it upon the governor, though he had the hands of all the council of Batavia, except one, to the order for the massacre. The flates, therefore, dispatched a packet to the Cape of Good Hope, containing orders to apprehend the governor, and send him back to Batavia to be tried. He was accordingly apprehended at the Cape; but has never been heard of since. It is supposed, he was thrown over-board in his passage to Batavia, that there might be no farther inquiries into the matter; and, it is said, all the wealth this merciful gentleman had amassed, and sent over before him in four ships, was cast away in the passage.

Besides the garrison here, the Dutch, it is said, have about 15,000 men in the island, either Dutch, or formed out of the several nations they have enslaved;

Javelin
||
Iberis.

slaved; and they have a fleet of between 20 and 30 men of war, with which they give law to every power on the coast of Asia and Africa, and to all the European powers that visit the Indian Ocean, unless we should now except the British: it was, however, but a little before the revolution, that they expelled us from our settlement at Bantam.

JAVELIN, in antiquity, a sort of spear five feet and an half long; the shaft of which was of wood, with a steel point.—Every soldier in the Roman armies had seven of these, which were very light and slender.

JAVELLO (Chrysostome), a learned Italian Dominican of the 16th century, taught philosophy and theology at Bologna, and died about the year 1540. He wrote a work on philosophy, another on politics, and another on Christian economy, which are esteemed; with notes on Pomponatius, and other works, printed in 3 vols folio.

JAWER, a city of Silesia, capital of a province of the same name, with a citadel, and a large square surrounded with piazzas. It is 12 miles south-east of Lignitz, 30 south-west of Breslau, and 87 east of Prague. E. Longitude 16. 29. N. Lat. 50. 56.

JAUNDICE. See (the *Index* subjoined to) *MEDICINE*.

JAW, in anatomy. See there, n° 19, 25.

Locked JAW, in medicine. See (the *Index* subjoined to) *MEDICINE*.

JAY (Guy Michaele), a French gentleman, who distinguished himself by causing a polyglot bible to be printed at his own expence in 10 vols folio: but he ruined himself by that impression, first because he would not suffer it to appear under the name of cardinal Richelieu, who, after the example of cardinal Ximenes, was ambitious of eternizing his name by this means; and next, because he made it too dear for the English market; on which Dr Walton undertook his polyglot bible, which, being more commodious, reduced the price of Mr le Jay's. After the death of his wife, M. le Jay took orders, was made dean of Vezeley in the Nivernois, and Lewis XIV. gave him the post of counsellor of state.

JAZER, or **JASER**, (anc. geog.), a Levitical city in the territory of the Amorrites beyond Jordan, 10 miles to the west, or rather south-west, of Philadelphia, and 15 miles from Eschbon; and therefore situated between Philadelphia and Heshbon, on the east border of the tribe of Gad, supposed to be the *Jazorem* of Josephus. In Jeremiah xlviii. mention is made of the sea of Jazer, that is a lake; taken either for an effusion or overflowing of the Arnon, or a lake thro' which it passes, or from which it takes its rise.

IBERIS, *SCIATICA* CRESS, or *Candy-tuft*; a genus of the filiculosa order, belonging to the tetradynamia class of plants.

Species. 1. The umbellate, or common candy-tuft, hath herbaceous, short, round, and very brachy stalks of tufty growth, from about six to eight or ten inches high; small spear-shaped leaves, the lower ones serrated, the upper entire; and all the stalks and branches terminated by umbellate clusters of flowers of different colours in the varieties. 2. The amara, or bitter candy-tuft, hath stalks branching like the former, which rise from eight to ten or twelve inches high; small,

spear-shaped, and slightly indented leaves; and all the branches terminated by racemose bunches of white flowers in June and July. 3. The sempervirens, commonly called *tree candy-tuft*, hath low undershrubby stalks very brachy and bushy, rising to the height of 10 or 12 inches, with white flowers in umbels at the ends of the branches, appearing great part of the summer. 4. The sempervirens, or ever-flowering shrubby iberis, hath low undershrubby stalks very brachy, growing to the height of 18 inches, with white flowers in umbels at the ends of the branches, appearing at all times of the year.

Culture. The two first kinds, being hardy annuals, may be sowed in any common soil in the month of March, or from that time till midsummer, and will thus afford a succession of flowers from June to September, which are succeeded by great plenty of seeds. The other two are somewhat tender; and therefore must be planted in pots, in order to be sheltered from the winter frosts. They are easily propagated by slips or cuttings.

IBEX, in zoology. See *CAPRA*.

IBIS, in ornithology. See *TANTALUS*.

IBYCUS, a Greek lyric poet, of whose works there are only a few fragments remaining, flourished 550 B. C. It is said, that he was assassinated by robbers; and that, when dying, he called upon some cranes he saw flying to bear witness. Some time after, one of the murderers seeing some cranes, said to his companions, "There are the witnesses of Ibycus's death:" which being reported to the magistrates, the assassins were put to the torture, and having confessed the fact, were hanged. Thence arose the proverb *Ibyci Crues*.

ICE, in physiology, a solid, transparent, and brittle body, formed of some fluid, particularly water, by means of cold. See *FROST*.

The younger Lemery observes, that ice is only a re-establishment of the parts of water in their natural state; that the mere absence of fire is sufficient to account for this re-establishment; and that the fluidity of water is a real fusion, like that of metals exposed to the fire; differing only in this, that a greater quantity of fire is necessary to the one than the other. Galileo was the first that observed ice to be lighter than the water which composed it: and hence it happens, that ice floats upon water, its specific gravity being to that of water as eight to nine. This rarefaction of ice seems to be owing to the air-bubbles produced in water by freezing; and which, being considerably large in proportion to the water frozen, render the body so much specifically lighter: these air-bubbles, during their production, acquire a great expansive power, so as to burst the containing vessels, tho' ever so strong. See *CONGELATION*, *COLD*, &c.

M. Mairan, in a dissertation on ice, attributes the increase of its bulk chiefly to a different arrangement of the parts of the water from which it is formed; the icy skin on the water being composed of filaments which are found to be constantly and regularly joined at an angle of 60°; and which, by this angular disposition, occupy a greater volume than if they were parallel. He found the augmentation of the volume of water by freezing, in different trials, a 14th, an 18th, a 19th, and, when the water was previously purged

Iberis
||
Ice.

ged of air, only a 2d part: that ice, even after its formation, continues to expand by cold; for, after water had been frozen to some thickness, the fluid part being let out by a hole in the bottom of the vessel, a continuance of the cold made the ice convex; and a piece of ice which was at first only a 14th part specifically lighter than water, on being exposed some days to the frost, became a 12th part lighter. To this cause he attributes the bursting of ice on ponds.

Wax, resins, and animal-fats, made fluid by fire, instead of expanding like watery liquors, shrink in their return to solidity: for solid pieces of the same bodies sink to the bottom of the respective fluids; a proof that these bodies are more dense in their solid than in their fluid state. The oils which congeal by cold, as oil-olive, and the essential oil of aniseeds, appear also to shrink in their congelation. Hence, the different dispositions of different kinds of trees to be burst by, or to resist, strong frosts, are by some attributed to the juices with which the tree abounds; being in the one case watery, and in the other resinous or oily.

Ice-House, a building contrived to preserve ice for the use of a family in the summer-season.

Ice-houses are more generally used in warm countries than with us; particularly in Italy, where the meanest person who rents a house, has his vault or cellar for ice.

As to the situation, it ought to be placed upon a dry spot of ground; because wherever there is moisture, the ice will melt: therefore in all strong lands which retain the wet, too much pains cannot be taken to make drains all round them. The place should also be elevated, and as much exposed to the sun and air as possible.

As to the figure of the building, that may be according to the fancy of the owner; but a circular form is most proper for the well in which the ice is to be preserved, which should be of a size and depth proportionable to the quantity to be kept: for it is proper to have it large enough to contain ice for two years consumption; so that if a mild winter should happen, in which little or no ice is to be had, there may be a stock to supply the want. At the bottom of the well, there should be a space of about two feet deep, left to receive any moisture that may drain from the ice; over this space should be placed a strong wooden grate, and from thence a small drain should be laid under ground to carry off the wet. The sides of the well should be built with brick or stone, at least two bricks thick; for the thicker it is, the less danger there will be of the well being affected by any external cause. When the wall is brought up within three feet of the surface, there should be another outer arch or wall begun, which should be carried up to the height of the top of the intended arch of the well; and if there be a second arch turned over this wall, it will add to the goodness of the house: the roof must be high enough above the inner arch to admit of a door-way to get out the ice. If the building is to be covered with slates or tiles, reeds should be laid considerably thick under them, to keep out the sun and external air; and if these reeds are laid the thickness of six or eight inches, and plastered over with lime and hair, there will be no danger of the heat getting through them. The external wall may be built in what form the pro-

prietor pleases; and as these ice-houses are placed in gardens, they are sometimes so contrived as to have an handsome alcove-seat in front, with a small door behind it, through which a person might enter to take out the ice; and a large door on the other side, fronting the north, with a porch wide enough for a small cart to back, in order to shoot down the ice near the mouth of the well, which need not be more than two feet diameter, and a stone so contrived as to shut it up in the exactest manner: all the vacant space above and between this and the large door should be filled up with barley-straw. The building thus finished, should have time to dry before the ice is put into it.

It is to be observed, that upon the wooden grate, at the bottom of the well, there should be laid some small faggots; and if upon these a layer of reeds is placed smooth for the ice to lie upon, it will be better than straw, which is commonly used. As to the choice of the ice, the thinner it is, the easier it may be broken to powder; for the smaller it is broken, the better it will unite when put into the well. In putting it in, care must be taken to ram it as close as possible; and also to allow a vacancy of two inches, all round, next the side of the well, to give passage to any moisture occasioned by the melting of some of the ice. When the ice is put into the well, if a little salt-petre be mixed with it at every ten inches or a foot in thickness, it will cause it to unite more closely into a solid mass.

Ice-Island, a name given by sailors to a great quantity of ice collected into one huge solid mass, and floating about upon the seas near or within the Polar Circles.—Many of these fluctuating islands are met with on the coasts of Spitzbergen, to the great danger of the shipping employed in the Greenland fishery. Towards the South Pole, they are still more numerous and formidable; but for a particular account of these islands and their formation, see the articles *NORTH-SEA* and *SOUTH-SEA*.

ICELAND, a large island lying in the northern part of the Atlantic Ocean, between 63 and 68 degrees of north latitude, and between 10 and 26 degrees of west longitude, its greatest length being about 700 miles, and its breadth 300.

This country lying partly within the frigid zone, and being liable to be surrounded with vast quantities of ice which come from the Polar Seas, is on account of the coldness of its climate very inhospitable; but much more so for other reasons. It is exceedingly subject to earthquakes; and so full of volcanoes, that the little part of it which appears fit for the habitation of man seems almost totally laid waste by them. The best account that hath yet appeared of the island of Iceland is in a late publication intitled, “*Letters on Iceland, &c.*” written by Uno Von Troil, D.D. first chaplain to his Swedish majesty.” This gentleman failed from London on the 12th of July 1772, in company with Mr Banks, Dr Solander, and Dr James Lind of Edinburgh, in a ship for which L. 100 Sterling was paid every month. After visiting the western isles of Scotland, they arrived on the 28th of August at Iceland, where they cast anchor at Bessfæddur or Bessfættadr, lying in about 64° 6' N. Lat. in the western part of the island. The country had to them the most dismal appearance that can be conceived. “I-

General account of the country.

Iceland.

Imagine to yourself (says Dr Troil,) a country, which from one end to the other presents to your view only barren mountains, whose summits are covered with eternal snow, and between them fields divided by vitrified cliffs, whose high and sharp points seem to vie with each other to deprive you of the sight of a little grass which scantily springs up among them. These same dreary rocks likewise conceal the few scattered habitations of the natives, and no where a single tree appears which might afford shelter to friendship and innocence. The prospect before us, though not pleasing, was uncommon and surprising. Whatever presented itself to our view bore the marks of desolation; and our eyes, accustomed to behold the pleasing coasts of England, now saw nothing but the vestiges of the operation of a fire, Heaven knows how ancient!

"On our landing, we found two tracts of lava, called *gorde* and *hvaldeyr-brann*, (for what we and the Italians call *lava*, is called in Iceland *brann*, from *brinna*, "to flow"), of which the last was particularly remarkable, since we find there a whole field covered with lava, which must have been liquefied in the highest degree; and whole mountains of turf. Chance had directed us exactly to a spot on which we could better than on any other part of Iceland consider the operations of a fire which had laid waste a stretch of 10 or 12 miles (A).

2
Mount
Hecla de-
scribed.

"We had now seen almost all the effects of a volcano except the crater from whence the fire proceeded; and in order to examine this likewise, we undertook a journey of 12 days to mount Hecla itself. We travelled 50 or 60 miles, (300 or 360 English ones,) over an uninterrupted track of lava, and had at last the pleasure of being the first who ever reached the summit of this celebrated volcano. The reason that no one has been there before is partly founded in superstition, and partly in the extreme difficulty of the ascent before the last discharge of fire, which happened in 1766. This mountain has been more taken notice of than many others in the country of as great extent, partly from its having vomited fire more frequently, and partly from its situation, which exposes it to the sight of ships sailing to Greenland and North America. It is situated in the southern part of the island, about four miles from the sea-coast, and is divided into three points at the top; the highest of which is that in the middle; and is, according to an exact observation with Ramsden's barometer, 5000 feet higher than the sea. We made use of our horses, but were obliged to quit them at the first opening from which the fire had burst. This was a place surrounded with lofty glazed walls, and filled with high glazed cliffs, which I cannot compare with any thing I ever saw before.

"A little higher up, we found a large quantity of grit and stones; and still farther on, another opening, which, though not deep, descended lower down than that of the highest point. We thought we plainly observed marks of hot boiling water in this place. Not far from thence the mountains began to be covered with snow, some small spots excepted, which were bare. We could not at first discern the cause of this difference, but soon found that it proceeded from the

Iceland.

vapour which arose from the mountain. As we ascended higher, these spots became larger; and about 200 yards from the summit, we found a hole of about one yard and a half in diameter, from which so hot a steam exhaled, that it prevented us from ascertaining the degree of heat with the thermometer.

"The cold now began to be very intense, as Fahrenheit's thermometer, which was at 54 at the foot of the mountain fell to 24. The wind was also become so violent, that we were sometimes obliged to lie down, to avoid being thrown into the most dreadful precipices by its fury.

"We were now arrived at one of the highest summits, when our conductor who did not take great pleasure in the walk, endeavoured to persuade us that this was the highest part of the mountains. We had just finished our observations, and found by them that Ramsden's barometer stood at 24.238, and the thermometer fixed to it at 27, when happily the clouds divided, and we discovered a still higher summit. Here we experienced at one and the same time a high degree of heat and cold; for in the air Fahrenheit's thermometer was constantly at 24, and when we set it down on the ground it rose to 153. The barometer was here at 22.247.—We could not safely remain here for any long time, though we were very much inclined to it; and therefore descended, after having considered the last opening there, one of the sides of which was entirely overturned, and the other quite covered with ashes and grit. In our return we observed three considerable openings, in one of which every thing looked as red as brick. From another the lava had flowed in a stream of about 50 yards in breadth, and at some distance from thence the stream divided into three broad arms. Further on we found a large circular opening, at the bottom of which we observed a mountain in the form of a sugar-loaf, in throwing up of which the fire seemed to have exhausted itself.

"The mountain does not consist of lava, but chiefly of sand, grit, and ashes; which are thrown up with the stones partly melted and partly discoloured by the fire. We likewise found several sorts of pumice, and among them one piece with some sulphur in it. The pumice was sometimes so much burnt, that it was as light as tow; their form and colour was sometimes very fine, but at the same time so soft, that it was difficult to remove them from one place to another. Of the common lava we found both large pieces and small bits; as likewise a quantity of black Jasper burned at the extremities, and resembling trees and branches. Among the stones thrown out of the mountain we saw some slate of a strong red colour. In one place the lava had taken the form of chimney-stalks half-broken down.

"It scarcely ever happens that any of the Iceland Symptom³ volcanoes begin to throw out fire unexpectedly. For preceding the eruptions. besides a loud rumbling noise which is heard at a considerable distance, for several days preceding any eruption, and a roaring and cracking in the part from whence the fire is going to burst forth, many fiery meteors are observed, but unattended in general with any violent concussion of the earth, though sometimes earth-

(A) The miles mentioned by Dr Troil are always Swedish, ten and an half of which are equal to a degree on one of the great circles on the globe; and therefore one Swedish mile is nearly equal to six English miles. Ten or twelve such miles are, consequently, equal to 60 or 70 English ones.

Iceland.

earthquakes, of which the history of the country affords several instances, have accompanied these dreadful conflagrations.—It is likewise considered as a sign of an impending eruption, when small lakes, rivulets, and streams, dry up. Some persons believe, that it does not a little contribute to hasten the eruption, when the mountain is so covered with ice that the holes are stopped up through which the exhalations formerly found a free passage; and though it is by no means probable that this contributes much to it, it cannot be denied that the fire is generally contained in these mountains covered with ice, or, as the Icelanders call them, *jökuls*.

“The sign of an eruption going to take place immediately, is the burbling of the mafs of ice with a dreadful noise. Flames then burst forth, and lightning and balls of fire issue from the smoke. With the flames proceed a number of larger and smaller stones, which are sometimes thrown to an incredible distance. A round stone about a Swedish ell (two feet) in diameter was thrown from Hecla, in the last eruption, to the distance of near six English miles. Egbert Olafsen also relates, that at the last eruption of Kattlegiaa, another volcano, a stone which weighed 290 pounds was thrown to the distance of 24 English miles. A quantity of white pumice-stone is also thrown up, with the boiling waters; and it is conjectured with great probability that the latter proceed from the sea, as a quantity of salt sufficient to load several horses has frequently been found after the mountain has ceased to burn.—Then follow generally brown or black pumice stone, sand, ashes, and lava.

4
ices and
its form-
by the
ruptions.

“The lava is seldom found near the opening; but rather tufa, or loose ashes and grit; and indeed the greater part of the Icelandic mountains consist of this matter, which, when it is grown cold, generally takes an arched form. The upper crust frequently grows hard and solid, whilst the melted matter beneath it continues liquid; this forms great cavities, whose walls, bed, and roof, are of lava, and where great quantities of stalactite of lava are found. There are a great number of these caves in Iceland, some of which are very large, and are made use of by the inhabitants for sheltering their cattle. The largest in the island is 5034 feet long, from 50 to 54 in breadth, and between 34 and 36 in height.

“Among the traces left by the eruptions of the Iceland volcanoes, are some prodigious clefts, the largest of which is called *Almenneggia*, near the water of Thingalla in the south-western part of the island. It is 105 feet in breadth, and of great length. The direction of the chasm itself is from north to south. Its western wall, from which the other has been perpendicularly divided is 107 feet six inches in height, and consists of many strata (each of which is about 10 inches in height) of lava grown cold at different times, as may easily be discovered by the apparent crust which is full of blisters, of a darker brown, and not so much compressed as the remaining part of the mafs of lava. The eastern wall is only 45 feet 4 inches in height; and that part of it which is directly opposite to the highest part of the other side is no more than 36 feet five inches high.

“The eruptions of the Iceland volcanoes are no less terrible and destructive than those of Vesuvius and

Iceland.

Ætna. The first mentioned in the ancient records happened in the ninth century, immediately after the arrival of the Norwegians on the island; and produced a lava three miles in length, and two and a half in breadth. After this there is no mention made of eruptions till the year 1000, when Christianity was introduced. At a time when the chiefs of the country were assembled to consult about the reception of the Christian religion, information was brought that an eruption of fire had happened. The heathens considered this as a proof of the wrath of the gods, on which account they were resolved to refuse the new religion; but this resolution was over-ruled by one of the assembly asking, “On whom did the gods display their wrath, when those rocks on which we now stand were on fire?”—In 1311, 22 farms were destroyed by eruptions, and 70 more in 1366. Hecla destroyed two in 1374; seven in 1390; and 18 in one day in 1436. In the same manner five farms were destroyed in 1660, and many more in 1693. In 1727, 600 sheep and 150 horses were destroyed by the flood and pieces of ice which rushed down the side of a volcano during an eruption. In 1728, many farms were destroyed, and a large lake entirely dried up. Into this lake the streams of fire that rolled from the mountains flowed during some years, and formed a tract of lava four miles in length, and one and a half in breadth. In 1755 six parishes were destroyed; and, in the last eruption of Hecla, a tract of many miles was laid waste.

“In the eruption of 1755, a flash of lightning⁶ was sent to burst from the flame, and pierced through the cliffs which intercepted its way. The flame lightning in one place killed eleven horses, three of which were in a stable. A farmer was also killed by it near the door of his room: his upper cloaths, which were woollen, remained entirely unburnt; but his shirt and waistcoat, which were both of linen, were burnt; and when his clothes were pulled off, it was found that the flesh and skin on his right side were consumed to the very bones. The maid-servant who wanted to assist him in saving the cattle was likewise struck by the lightning; but did not die till some days after, during which time she suffered inexpressible torture. It is likewise said that her cloaths were singed by the glutinous fires which cleaved to her body.

7
Account of
some of which spout up into the air to a surprising height of
Iceland.

“Iceland abounds with hot and boiling springs, the some of which spout up into the air to a surprising height. All the jets d’eau which have been contrived with so much art, and at such an enormous expence, cannot by any means be compared with these wonders of nature in Iceland. The water-works at Herenhausen throw up a single column of water of half a quarter of a yard in circumference to a height of about 70 feet; those at the Winterkasten at Cassel, throw it up, but in a much thinner column, 130 feet; and the jet d’eau at St Cloud, which is thought the greatest of all the French water-works, casts up a thin column 80 feet into the air: but some springs in Iceland pour forth columns of water several feet in thickness to the height of many fathoms; and many affirm, of several hundred feet.

“These springs are unequal in their degrees of heat; but we have observed none under 188 degrees of Fahrenheit’s thermometer, in some it is 192, 193,

5
lory of
erup-
36.

212, and in one small vein of water 213 degrees. From some the water flows gently, and the spring is then called *laug*, a "bath;" from others it spouts with a great noise, and is then called *hver*, or *kittel*. It is very common for some of these spouting springs to close up, and others to appear in their stead. All these hot waters have an incrusting quality, so that we very commonly find the exterior surface from whence it bursts forth covered with a kind of rind, which almost resembles clafed work, and which we at first took for lime, but which was afterwards found by Mr Bergman to be of a filiceous or stony nature. In some places the water tastes of sulphur, in others not; but when drank as soon as it is cold, tastes like common boiled water. The inhabitants use it at particular times for dyeing; and were they to adopt proper regulations, it might be of still greater use. Victuals may also be boiled in it, and milk held over its steam becomes sweet: owing, most probably, to the excessive heat of the water, as the same effect is produced by boiling it a long time over the fire. They have begun to make salt by boiling sea-water over it, which when it is refined, is very pure and good. The cows which drink this hot water yield a great deal of milk. Egbert Olafsen relates, that the water does not become turbid when alkali is thrown into it, nor does it change the colour of syrup of violets. Horrebow asserts, that if you fill a bottle at one of the spouting springs, the water will boil over two or three times while the spring throws forth its water; and if corked too soon, the bottle will burst.

8
A particular description of one named *Geyser*.

"Among the many hot springs to be met with in Iceland, several bear the name of *geyser*; the following is a description of the most remarkable of that name, and in the whole island. It is about two days journey from Hecla, near a farm called *Haukadal*. Here a poet would have an opportunity of painting whatever nature has of beautiful and terrible, united in one picture, by delineating this surprising phenomenon. Represent to yourself a large field, where you see on one side, at a great distance, high mountains covered with ice, whose summits are generally wrapped in clouds, so that their sharp and unequal points become invisible. This loss, however, is compensated by a certain wind, which causes the clouds to link, and cover the mountain itself when its summit appears as it were to rest on the clouds. On the other side Hecla is seen, with its three points covered with ice, rising above the clouds, and with the smoke which ascends from it, forming other clouds at some distance from the real ones: and on another side is a ridge of high rocks, at the foot of which boiling water from time to time issues forth; and further on extends a marsh of about three English miles in circumference, where are 40 or 50 boiling springs, from which a vapour ascends to a prodigious height.—In the midst of these is the greatest spring *geyser*, which deserves a more exact and particular account. In travelling to the place about an English mile and an half from the *hver*, from which the ridge of rocks still divided us, we heard a loud roaring noise, like the rushing of a torrent precipitating itself from stupendous rocks. We asked our guide what it meant; he answered, it was *geyser* roaring; and we soon saw with our naked eyes what before seemed almost incredible.

"The depth of the opening or pipe from which the water gushes cannot well be determined; for sometimes the water sunk down several fathoms, and some seconds passed before a stone which was thrown into the aperture reached the surface of the water. The opening itself was perfectly round, and 19 feet in diameter, and terminated in a basin 59 feet in diameter. Both the pipe and the basin were covered with a rough staltic rind, which had been formed by the force of the water: the outermost border of the basin is nine feet and an inch higher than the pipe itself. The water here spouted several times a-day, but always by starts; and after certain intervals. The people who lived in the neighbourhood told us, that they rose higher in cold and bad weather than at other times; and Egbert Olafsen and several others affirm, that it has spouted to the height of 60 fathoms. Most probably they guessed only by the eye, and on that account their calculation may be a little extravagant; and indeed it is to be doubted whether the water was ever thrown up so high, though probably it sometimes mounts higher than when we observed it. The method we took to observe the height was as follows. Every one in company wrote down, at each time that the water spouted, how high it appeared to him to be thrown, and we afterwards chose the medium. The first column marks the spoutings of the water, in the order in which they followed one another; the second, the time when these effusions happened; and the third, the height to which the water rose; and the last, how long each spouting of water continued.

No	Time	Height	Duration
1	At VI 42 m.	30 feet	0 20 seconds
2	—51	6	0 20
3	—VII 16	6	0 10
4	—31	12	0 15
5	—51	60	0 6
6	—VIII. 17	24	0 30
7	—39	18	0 40
8	—36	12	0 40

The pipe was now for the first time full of water, which ran slowly into the basin.

9	—IX. 25	48	1 10
10	—X. 16	24	1 00

"At 35 minutes after twelve we heard as it were three discharges of a gun under ground, which made it shake: the water flowed over immediately, but instantly sunk again. At eight minutes after two, the water flowed over the border of the basin. At 15 minutes after three, we again heard several subterranean noises, though not so strong as before. At 43 minutes after four, the water flowed over very strongly during the space of a minute. In six minutes after, we heard many loud subterraneous discharges, not only near the spring, but also from the neighbouring ridge of rocks where the water spouted. At 51 minutes after six, the fountain spouted up to the height of 92 feet, and continued to do so for four minutes. After this great effort, it sunk down very low into the pipe, and was entirely quiet during several minutes; but soon began to bubble again: it was not, however, thrown up into the air, but only to the top of the pipe.

"The force of the vapours which throw up these waters is excessive; it not only prevents the stones which

Iceland.

which are thrown into the opening from sinking, but even throws them up to a very great height, together with the water. When the balon was full, we placed ourselves before the fun in such a manner that we could see our shadows in the water; when every one observed round the shadow of his own head (though not round that of the heads of others,) a circle of almost the same colours which compose the rainbow, and round this another bright circle. This most probably proceeded from the vapours exhaling from the water.

“ Not far from this place, another spring at the foot of the neighbouring ridge of rocks spouted water to the height of one or two yards each time. The opening through which this water issued, was not so wide as the other: we imagined it possible to stop up the hole entirely by throwing large stones into it, and even flattered ourselves that our attempt had succeeded: but, to our astonishment, the water gushed forth in a very violent manner. We hastened to the pipe, and found all the stones thrown aside, and the water playing freely through its former channel. In these large springs the waters were hot in the highest degree, and tasted a little of sulphur; but in other respects it was pure and clear. In the smaller springs of the neighbourhood the water was tainted: in some, it was as muddy as that of a clay-pit; in others, as white as milk; and, in some few, as red as blood.

9
count of
basaltic
pillars.

“ Iceland abounds with pillars of basalt, which the lower sort of people imagine have been piled upon each other by the giants, who made use of supernatural force to effect it. They have generally from three to seven sides; and are from four to six feet in thickness, and from 12 to 16 yards in length, without any horizontal divisions. But sometimes they are only from six inches to one foot in height, and they are then very regular, inasmuch that they are sometimes made use of for windows and door-posts. In some places they only peep out here and there among the lava, or more frequently among the tufa; in other places they are quite overthrown, and pieces of broken pillars only make their appearance. Sometimes they extend without interruption for two or three miles in length. In one mountain they have a singular appearance: on the top the pillars lie horizontally, in the middle they are sloping; the lowest are perfectly perpendicular; and in some parts they are bent into a semicircular figure. The matter of the Iceland basalt seems to be the same with that of STAFFA; though in some it is more porous, and inclines to a grey. Some we observed which were of a blackish grey, and composed of several joints. Another time we observed a kind of porous glassy stone, consequently a lava, which was so indistinctly divided, that we were for some time at a loss to determine whether it was basalt or not, though at last we all agreed that it was.”

10
count of
climate.

The climate of Iceland is not unwholesome or naturally subject to excessive colds, notwithstanding its northerly situation. There have been instances indeed of Fahrenheit's thermometer sinking to 24° below the freezing point in winter, and rising to 104° in summer. Since the year 1749, observations have been made on the weather; and the result of these ob-

Iceland.

servations hath been unfavourable, as the coldness of the climate is thought to be on the increase, and of consequence the country is in danger of becoming unfit for the habitation of the human race. Wood, which formerly grew in great quantities all over the island, cannot now be raised. Even the hardy firs of Norway cannot be reared in this island. They seemed indeed to thrive till they were about two feet high; but then their tops withered, and they ceased to grow. This is owing chiefly to the storms and hurricanes which frequently happen in the months of May and June, and which are very unfavourable to vegetation of every kind. In 1772, governor Thodal sowed a little barley, which grew very briskly; but, a short time before it was to be reaped, a violent storm so effectually destroyed it, that only a few grains were found scattered about. Besides these violent winds, this island lies under another disadvantage, owing to the floating ice already mentioned, with which the coasts are often beset. This ice comes on by degrees, always with an easterly wind, and frequently in such quantities as to fill up all the gulphs on the north-west side of the island, and even covers the sea as far as the eye can reach; it also sometimes drives to other shores. It generally comes in January, and goes away in March. Sometimes it only reaches the land in April; and, remaining there for a long time, does an incredible deal of mischief. It consists partly of mountains of ice, said to be sometimes 60 fathoms in height; and partly of field-ice, which is neither so thick nor so much dreaded. Sometimes these enormous masses are grounded in shoal water; and in these cases they remain for many months, nay years, undissolved, chilling the atmosphere for a great way round. When many such bulky and lofty ice-masses are floating together, the wood which is often found drifting between them, is so much chafed, and pressed with such violence together, that it sometimes takes fire; which circumstance has occasioned fabulous accounts of the ice being in flames.

11
Destructive
effects of
the ice.

In 1753 and 1754, this ice occasioned such a violent cold, that horses and sheep dropped down dead by reason of it, as well as for want of food; horses were observed to feed upon dead cattle, and the sheep eat of each other's wool. In 1755, towards the end of the month of May, the waters were frozen over in one night to the thickness of an inch and five lines. In 1756, on the 26th of June, snow fell to the depth of a yard, and continued falling through the months of July and August. In the year following it froze very hard towards the end of May and beginning of June, in the fourth part of the island, which occasioned a great scarcity of grass. These frosts are generally followed by a famine, many examples of which are to be found in the Icelandic chronicles. Besides these calamities, a number of bears annually arrive with the ice, which commit great ravages among the sheep. The Icelanders attempt to destroy these intruders as soon as they get sight of them. Sometimes they assemble together, and drive them back to the ice, with which they often float off again. For want of firearms, they are obliged to use spears on these occasions. The government also encourages the destruction of these animals, by paying a premium of 10 dollars

dollars for every bear that is killed, and purchasing the skin of him who killed it.

Thunder and lightning are seldom heard in Iceland, except in the neighbourhood of volcanoes. Aurora Borealis is very frequent and strong. It most commonly appears in dry weather; though there are not wanting instances of its being seen before or after rain, or even during the time of it. The lunar halo, which prognosticates bad weather, is likewise very frequent here; as are also perihelions, which appear from one to nine in number at a time. These perihelions are observed chiefly at the approach of the Greenland ice, when an intense degree of frost is produced, and the frozen vapours fill the air. Fire-balls, sometimes round, and sometimes oval, are observed, and a kind of *ignis fatuus* which attaches itself to men and beasts; and comets are also frequently mentioned in their chronicles. This last circumstance deserves the attention of astronomers.

Iceland, besides all the inconveniencies already mentioned, has two very terrible ones, called by the natives *Krida* and *Sissfædi*: the name of the first imports large pieces of a mountain tumbling down and destroying the lands and houses which lie at the foot of it: this happened in 1554, when a whole farm was ruined, and 13 people buried alive. The other word signifies the effects of a prodigious quantity of snow, which covers the tops of the mountains, rolling down in immense masses, and doing a great deal of damage: of this there was an instance in 1699, during the night, when two farms were buried, with all their inhabitants and cattle. This last accident Iceland has in common with all very mountainous countries, particularly Switzerland.

12
History of
the island.

At what time the island of Iceland was first peopled is uncertain. An English colony indeed is said to have been settled there in the beginning of the fifth century; but of this there are not sufficient proofs. There is, however, reason to suppose, that the English and Irish were acquainted with this country under another name, long before the arrival of the Norwegians; for the celebrated Bede gives a pretty accurate description of the island. But of these original inhabitants we cannot pretend to say any thing, as the Iceland chronicles go no farther back than the arrival of the Norwegians. What they relate is to the following purpose.

Naddodr, a famous pirate, was driven on the coast of Iceland in 861, and named the country *Snio-land*, "Snow-land," on account of the great quantities of snow with which he perceived the mountains covered. He did not remain there long; but, on his return, extolled the country to such a degree, that one Gardar Suafarlon, an enterprising Swede, was encouraged by his account to go in search of it in 864. He sailed quite round the island, and gave it the name of *Gardal-fjollunur*, or Garder's island. Having remained in Iceland during the winter, he returned in the spring to Norway, where he described the new-discovered island as a pleasant well-wooded country. This excited a desire in Floke, another Swede, reputed the greatest navigator of his time, to undertake a voyage thither. As the compass was then unknown, he took three ravens on board to employ them on the discovery. By the way he visited his friends at Ferro; and having

failed farther to the northward, he let fly one of his ravens, which returned to Ferro. Some time after, he dismissed the second, which returned to the ship again, as he could find no land. The last trial proved more successful; the third raven took his flight to Iceland, where the ship arrived a few days after. Floke staid here the whole winter with his company; and, because he found a great deal of floating ice on the north side, he gave the country the name of *Iceland*, which it has ever since retained.

When they returned to Norway in the following spring, Floke, and those that had been with him, made a very different description of the country. Floke described it as a wretched place; while one of his companions, named *Thorulfr*, praised it so highly, that he affirmed butter dropped from every plant; which extravagant commendation procured him the name of *Thorulfr-finnur*, or Butter-Thorulfr.

From this time there are no accounts of any voyages to Iceland, till Ingolf and his friend Leifr undertook one in 874. They spent the winter on the island, and determined to settle there for the future. Ingolf returned to Norway, to provide whatever might be necessary for the comfortable establishment of a colony, and Leifr in the mean time went to assist in the war in England. After an interval of four years, they again met in Iceland, the one bringing with him a considerable number of people, with the necessary tools and instruments for making the country habitable; and the other imported his acquired treasures. After this period, many people went there to settle; and, in the space of 60 years, the whole island was inhabited. The tyranny of Harold king of Norway contributed not a little to the population of Iceland; and so great was the emigration of his subjects, that he was at last obliged to issue an order that no one should sail from Norway to Iceland, without paying four ounces of fine silver to the king.

Besides the Norwegians, new colonies arrived from different nations, between whom wars soon commenced; and the Icelandic histories are full of the accounts of their battles. To prevent these conflicts for the future, a kind of chief was chosen in 928, upon whom great powers were conferred. This man was the speaker in all their public deliberations; pronounced sentence in difficult and intricate cases; decided all disputes; and published new laws, after they had been received and approved of by the people at large: but he had no power to make laws, without the approbation and consent of the rest. He therefore assembled the chiefs, whenever the circumstances seemed to require it; and, after they had deliberated among themselves, he represented the opinion of the majority to the people, whose assent was necessary before it could be considered as a law. His authority among the chiefs and leaders, however, was considerable, as he was chosen by them, and retained his place no longer than while he preserved their confidence.

This institution did not prove sufficient to restrain the turbulent spirits of the Icelanders. They openly waged war with each other; and, by their intestine conflicts, so weakened all parties, that the whole became at last a prey to a few arbitrary and enterprising men; who, as is too generally the case, wantonly

wantonly abused their power to the oppression of their countrymen, and the disgrace of humanity. Notwithstanding these troubles, however, the Icelanders remained free from a foreign yoke till 1261; when the greatest part of them put themselves under the protection of Hakans king of Norway, promising to pay him tribute upon certain conditions agreed on between them; and the rest followed their example in 1264. Afterwards, Iceland, together with Norway, became subject to Denmark. For a long time the care of the island was committed to a governor, who commonly went there once a year; though, according to his instructions, he ought to have resided in Iceland. As the country suffered incredibly through the absence of its governors, it was resolved a few years ago that they should reside there, and have their seat at Bessfærd, one of the old royal domains. He has under him a bailiff, two laymen, a sheriff, and 21 *sysselmen*, or magistrates who superintend small districts; and almost every thing is decided according to the laws of Denmark.

At the first settlement of the Norwegians in Iceland, they lived in the same manner as they had done in their own country, namely, by war and piracy. Their situation with regard to the kings of Norway, however, soon obliged them to apply to other states, in order to learn as much of the knowledge of government and politics as was necessary to preserve their colony from subjugation to a foreign yoke. For this purpose they often sailed to Norway, Denmark, Sweden, England, and Scotland. The travellers, at their return, were obliged to give an account to their chiefs of the state of those kingdoms through which they passed. For this reason, history, and what related to science, was held in high repute as long as the republican form of government lasted; and the great number of histories to be met with in the country, shew at least the desire of the Icelanders to be instructed. To secure themselves, therefore, against their powerful neighbours, they were obliged to enlarge their historical knowledge. They likewise took great pains in studying perfectly their own laws, for the maintenance and protection of their internal security. Thus Iceland, at a time when ignorance and obscurity overwhelmed the rest of Europe, was enabled to produce a considerable number of poets and historians. When the Christian religion was introduced about the end of the 10th century, more were found conversant in the law than could have been expected, considering the extent of the country, and the number of its inhabitants. Fishing was followed among them; but they devoted their attention considerably more to agriculture, which has since entirely ceased.

Two things have principally contributed towards producing a great change both in their character and way of life, viz. the progress of the Christian religion, and their subjection first to Norway, and afterwards to Denmark. For if religion, on one side, commanded them to desist from their ravages and warlike expeditions; the secular power, on the other, deprived them of the necessary forces for the execution of them: and, since this time, we find no farther traces of their heroic deeds, except those which are preserved in their histories.

The modern Icelanders apply themselves to fishing and breeding of cattle. They are middle-sized and well-made, though not very strong; and the women are in general ill-featured. Vices are much less common among them, than in other parts where luxury and riches have corrupted the morals of the people. Though their poverty disables them from imitating the hospitality of their ancestors in all respects, yet they continue to shew their inclination to: they cheerfully give away the little they have to spare, and express the utmost joy and satisfaction if you are pleased with their gift. They are uncommonly obliging and faithful, and extremely attached to government. They are very zealous in their religion. An Iceland never passes a river or any other dangerous place, without previously taking off his hat, and imploring the divine protection; and he is always thankful for the protection of the Deity, when he has passed the danger in safety. They have an inexpressible attachment to their native country, and are nowhere so happy. An Iceland therefore rarely settles in Copenhagen, tho' ever such advantageous terms should be offered him. On the other hand, we cannot ascribe any great industry or ingenuity to these people. They work on in the way to which they have all along been accustomed, without thinking of improvements. They are not cheerful in conversation, but simple and credulous; and have no aversion against a bottle, if they can find an opportunity. When they meet together, their chief pastime consists in reading their history. The master of the house makes the beginning, and the rest continue in their turns when he is tired. Some of them know these stories by heart; others have them in print, and others in writing. Besides this, they are great players at chess and cards, but only for their amusement, since they never play for money: which, however, seems to have been formerly in use among them; since, by one of their old laws, a fine is imposed upon those who play for money.

The modern Icelanders have made very little alteration in their dress from what was formerly in use. The men all wear a linen shirt next to the skin, with a short jacket, and a pair of wide breeches over it. When they travel, another short coat is put over all. The whole is made of coarse black cloth, called *wadmal*; but some wear clothes of a white colour. On their head they wear large three-cornered hats, and on their feet Iceland shoes and worsted stockings. Some of them indeed have shoes from Copenhagen; but, as they are rather too dear for them, they generally make their own shoes, sometimes of the hide of oxen, but more frequently of sheep's leather. They make them by cutting a square piece of leather, rather wider than the length of the foot; this they sew up at the toes, and behind at the heel, and tie it on with leather-thongs. These shoes are convenient enough where the country is level; but it would be very difficult for us who are not accustomed to walk with them amongst the rocks and stones, though the Icelanders do it with great ease.

The women are likewise dressed in black wadmal. They wear a bodice over their shifts, which are sewed up at the bosom; and above this a jacket laced before, with long narrow sleeves reaching down to the wrists.

Iceland.

13
liners
of the
Icelanders.

14
Their dress.

Iceland.

wrists. In the opening on the side of the sleeve, they have buttons of chased silver, with a plate fixed to each button; on which the lover, when he buys them in order to present them to his mistress, takes care to have his name engraved along with hers. At the top of the jacket a little black collar is fixed, of about three inches broad, of velvet or silk, and frequently trimmed with gold cord. The petticoat is likewise of wadmal, and reaches down to the ankles. Round the top of it is a girdle of silver or some other metal, to which they fasten the apron, which is also of wadmal, and ornamented at top with buttons of chased silver. Over all this they wear an upper-dress nearly resembling that of the Swedish peasants; with this difference, that it is wider at bottom: this is close at the neck and wrists, and a hand's-breadth shorter than the petticoat. It is adorned with a facing down to the bottom, which looks like cut velvet, and is generally wove by the Icelandic women. On their fingers they wear gold, silver, or brass rings. Their head-dress consists of several cloths wrapped round the head almost as high again as the face. It is tied fast with a handkerchief, and serves more for warmth than ornament. Girls are not allowed to wear this head-dress till they are marriageable. At their weddings they are adorned in a very particular manner: the bride wears, close to the face, round her head-dress, a crown of silver gilt. She has two chains round her neck, one of which hangs down very low before, and the other rests on her shoulders. Besides these, she wears a lesser chain, from whence generally hangs a little heart, which may be opened to put some kind of perfume in it. This dress is worn by all the Icelandic women without exception: only with this difference, that the poorer sort have it of coarse wadmal, with ornaments of brass; and those that are in easier circumstances have it of broad cloth, with silver ornaments gilt.

35
Houses.

The houses of the Icelanders are very indifferent, but the worst are said to be on the south side of the island. In some parts they are built of drift-wood, in others of lava, almost in the same manner as the stone-walls we make for inclosures, with moss stuffed between the pieces of lava. In some houses the walls are wainscotted on the inside. The roof is covered with sods, laid over rafters, or sometimes over the ribs of whales; the walls are about three yards high, and the entrance somewhat lower. Instead of glass, the windows are made of the chorion and amnios of sheep, or the membranes which surround the womb of the ewe. These are stretched on a hoop, and laid over a hole in the roof. In the poorer sort of houses they employ for the windows the inner membrane of the stomach of animals, which is less transparent than the others.

36
Diet.

As the island of Iceland produces no kind of grain, the inhabitants of consequence have no bread but what is imported; and which being too dear for common use, is reserved for weddings and other entertainments. The following list of their viands is taken from Troil's Letters.

"1. Flour of *salgras*, (lichen islandicus, or rock-fossils). The plant is first washed, and then cut into small pieces by some; though the greater number dry it by fire or in the sun, then put it into a bag in which it is well beaten, and lastly work it into a flour by

flamping.

"2. Flour of *kompgrg*, (polygonum bistorta), is prepared in the same manner, as well as the two other sorts of wild corn *melur* (*Arundo arenaria*, and *Arundo foliorum lateribus convolutis*), by separating it from the chaff, pounding, and lastly grinding it.

"3. *Surt smorg*, (sour butter). The Icelanders seldom make use of fresh or salt butter, but let it grow sour before they eat it. In this manner it may be kept for 20 years, or even longer; and the Icelanders look upon it as more wholesome and palatable than the butter used among other nations. It is reckoned better the older it grows, and one pound of it then is valued as much as two of fresh butter.

"4. *Strug*, or whey boiled to the consistence of four milk, and preserved for the winter.

"5. Fish of all kinds, both dried in the sun and in the air, and either salted or frozen. Those prepared in the last manner are preferred by many.

"6. The flesh of bears, sheep, and birds, which is partly salted, partly hung or smoked, and some preserved in calks with sour or fermented whey poured over it.

"7. *Mjóst*, or whey boiled to cheese, which is very good. But the art of making other kinds of good cheese is lost, tho' some tolerably palatable is sold in the east quarter of Iceland.

"8. *Beina-strug*, bones and cartilages of beef and mutton, and likewise bones of cod, boiled in whey till they are quite dissolved: they are then left to ferment, and are eat with milk.

"9. *Skyr*. The curds from which the whey is squeezed are preserved in calks or other vessels; they are sometimes mixed with black crow-berries or juniper-berries, and are likewise eat with new milk.

"10. *Syra*, is four whey kept in calks, and left to ferment; which, however, is not reckoned fit for use till a year old.

"11. *Blanda*, is a liquor made of water, to which a twelfth part of *syra* is added. In winter, it is mixed with the juice of thyme, and of the black crow-berries.

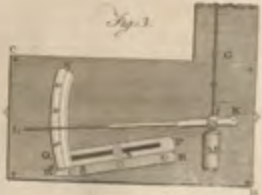
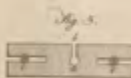
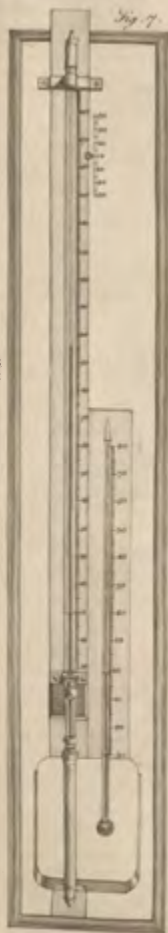
"12. They likewise eat many vegetables, some of which grow wild, and some are cultivated; also shell-fish and mushrooms."

The Icelanders in general eat three meals a-day, at seven in the morning, two in the afternoon, and nine at night. In the morning and evening they commonly eat curds mixed with new milk, and sometimes with juniper or crow berries. In some parts, they also have pottage made of rock-grass, which is very palatable, or curdled milk boiled till it becomes of a red colour, or new milk boiled a long time. At dinner, their food consists of dried fish, with plenty of sour butter; they also sometimes eat fresh fish, and, when possible, a little bread and cheese with them. It is reported by some, that they do not eat any fish till it is quite rotten; this report perhaps proceeds from their being fond of it when a little tainted: they however frequently eat fish which is quite fresh, though, in the same manner as the rest of their food, often without salt.

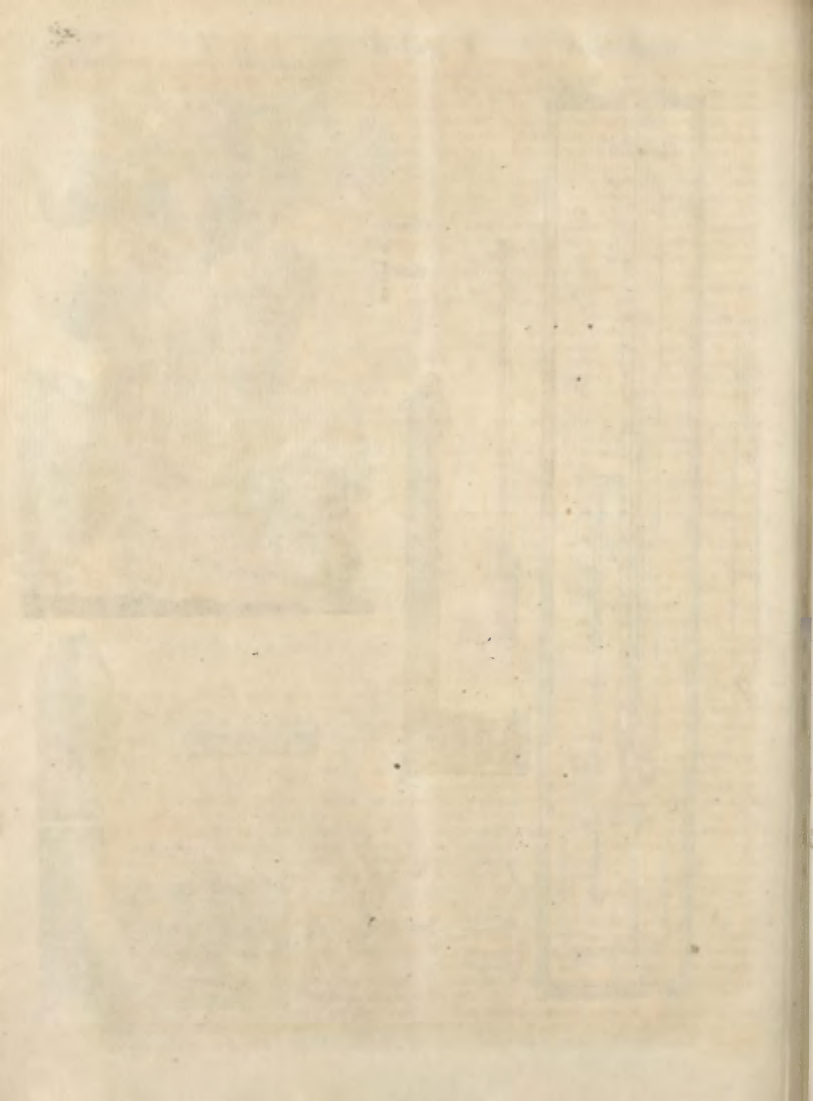
Their common beverage is milk, either warm from the cow, or cold, and sometimes boiled: they likewise use butter-milk with or without water. On the coasts

Iceland.

Fig. 1) Boiling FOUNTAIN, see ICELAND, N.º 8.



A. B. C. D. E. F. G. H. I. J. K. L. M. N. O. P. Q. R. S. T. U. V. W. X. Y. Z.



celand.

coasts they generally drink blanda and four milk; which is sold after it is skimmed, at two fifths of a rixdollar per cask: some likewise send for beer from Copenhagen, and some brew their own. A few of the principal inhabitants also have claret and coffee. The common people sometimes drink a kind of tea, which they make from the leaves of the *dryas octopetala*, and the *veronica officinalis*.

17
employ-
ment, ma-
recurses,

On the coasts, the men employ themselves in fishing, both summer and winter. On their return home, when they have drawn and cleaned their fish, they give them to their wives, whose care it is to dry them. In the winter, when the inclemency of the weather prevents them from fishing, they are obliged to take care of their cattle and spin wool. In summer, they mow the grass, dig turf, provide fuel, go in search of sheep and goats that were gone astray, and kill cattle. They prepare leather with the *spiraea ulmaria* instead of bark. Some few work in gold and silver; and others are instructed in mechanics, in which they are tolerable proficient. The women prepare the fish, take care of the cattle, manage the milk and wool, sew, spin, and gather eggs and down. When they work in the evening, they use, instead of an hour-glass, a lamp with a wick made of epilobium dipt in train oil, which is contrived to burn four, six, or eight hours.

Among the common people of Iceland, time is not reckoned by the course of the sun, but by the work they have done, and which is prescribed by law. According to this prescription, a man is to mow as much hay in one day as grows on 30 fathoms of manured soil, or 40 fathoms of land which has not been manured; or he is to dig 700 pieces of turf eight feet long and three broad. If as much snow falls as reaches to the horses bellies, a man is required daily to clear a piece of ground sufficient for 100 sheep. A woman is to rake together as much hay as three men can mow, or to weave three yards of wadmal a-day.

The wages of a man are fixed at four dollars, and 12 yards of wadmal; and those of a woman at two dollars, and five yards of wadmal. When men are sent a-fishing out of the country, there is allowed to each man by law, from the 25th of September to the 14th of May, six pounds of butter, and 18 pounds of dried fish every week. This may seem to be too great an allowance; but it must be remembered that they have nothing else to live upon. When they are at home, and can get milk, &c. every man receives only five pounds of dried fish and three quarters of a pound of butter a-week.

18
diseases.

The food and manner of life of the Icelanders by no means contribute to their longevity. It is very rare indeed to see an inhabitant of Iceland exceed the age of 50 or 60; and the greater part are attacked by grievous diseases before middle age. Of these the scurvy and elephantiasis or prophy are the worst. They are also subject to the gout in their hands, owing to their frequent employment in fishing, and handling the wet fishing-tackle in cold weather. St Anthony's fire, the jaundice, pleurisy, and lowness of spirits, are frequent complaints in this country. The small-pox is also exceedingly fatal, and not long ago destroyed 16,000 persons. By these diseases, and the frequent famines with which the country has been afflicted, the

Vol. V.

inhabitants are reduced to a much fewer number than they formerly were, inasmuch that it is computed they do not in all exceed 60,000.

The exports of Iceland consist of dried fish, salted mutton and lamb, beef, butter, tallow, train-oil, coarse woollen cloth, stockings, gloves, raw wool, sheep-skins, lamb-skins, fox-furs of various colours, eider down, feathers, and formerly sulphur; but there is no longer a demand for this mineral. On the other hand, the Icelanders import timber, fishing-lines and hooks, tobacco, bread, horse-shoes, brandy, wine, salt, linen, a little silk, and a few other necessaries, as well as superfluities for the better sort. The whole trade of Iceland is engrossed by a monopoly of Danes, indulged with an exclusive charter. This company maintains factories at all the harbours of Iceland, where they exchange their foreign goods for the merchandize of the country; and, as the balance is in favour of the Icelanders, pay the overplus in Danish money, which is the only current coin in this island. All their accounts and payments are adjusted according to the number of fish: two pounds of fish are worth two skillings in specie, and 48 fish amount to one rixdollar. A Danish crown is computed at 30 fish: what falls under the value of 12 fish, cannot be paid in money; but must be bartered either for fish or roll-tobacco, an ell of which is equal to one fish. The weights and measures of the Icelanders are nearly the same with those used in Denmark.

The Icelanders being neither numerous nor warlike, and altogether unprovided with arms, ammunition, garrisons, or fleets, are in no condition to defend themselves from invasion; but depend entirely on the protection of his Danish majesty, to whom they are subject.

The revenues which he draws from this island consist of the income of divers estates, as royal demesne, amounting to about 8000 dollars per annum; of the money paid by the company for an exclusive trade, to the value of 20,000 dollars; and of a fixed proportion in the tythes of fish, paid in some particular districts.

ICENI, the ancient name of the people of Suffolk, Norfolk, Cambridgeshire, and Huntingdonshire, in England.

ICH-DIEK. See HERALDRY, chap. iv. sect. 2.

ICHNEUMON, in zoology. See VIVERRA.

ICHNEUMON, is also the name of a genus of flies of the hymenoptera order. It has no tongue; the antennæ have above 30 joints; the abdomen, in most of the species, is petiolated; and it has a sting in the tail inclosed in a double-valved cylindrical sheath. There are 77 species, principally distinguished by their colour.—These flies are sometimes at great pains to destroy and carry the caterpillars in whose bodies they intend to lay their eggs, to places where it is proper those eggs should be hatched. There is one species, whose worm produced from the egg can never succeed, unless it is both bred in the body of a caterpillar, and also have that habitation buried under ground. For this purpose, the parent-fly, when the time of laying her eggs is come, forms a hole in the ground, which she covers with a little clod of earth, that no dust may fall in to fill it up; when this is done, she goes out in quest of a caterpillar proper for her

Iceni
||
Ichneumon.

19
Commerce
and reve-
nue.

Ichthography.
Ichthogloss.

purpose. Dr Lister assures us, that he has often seen one of these flies seize a caterpillar much larger than herself; and though this has been at a considerable distance from her hole, she has with great labour dragged the creature to it. As soon as she has arrived there with her load, she takes off the little pellet of earth from the mouth of the hole, and going down to see that all is ready for the reception of the new guest, she returns out of it and draws in the caterpillar, which she leaves there after giving it such wounds as, though they do not cause immediate death, yet disable the creature so as to make its escape impracticable. When the creature is thus lodged, she deposits her eggs in the flesh; after which she stops up the orifice of the hole very firmly with several pellets of dirt, and with dust carefully rammed in between, and will even fly up into gummy and resinous trees in order to get a cement to hold all firmly together. When the hole is thus filled up even with the surface of the rest of the ground, she draws a leaf or two to the place, and laying them over the mouth flies away. There is after this no more care taken; but the young worms are hatched from the eggs, and feed on the flesh of the caterpillar till they are fully grown. They then change into the nymph-state, and come out of that in form of their parent-flies, in which state they usually make their way out of the ground. Some of these ichneumons make the bodies of other smaller flies the places of hatching their eggs. They may be often met with flying with one of these small flies in their legs, the head of it being held close to their bellies. If they are watched on this occasion, they will usually be found to carry those flies to certain holes in the ground resembling worm-holes. The first that they carry serves as a nidus for their eggs: the rest are for food to the young ones while in the state of worms; these being too voracious to be subsisted long on the body of one fly, and therefore their parents carry them more every day. The old ones on this occasion crawl backwards into the holes, dragging the flies in after them. When their young worms have fed sufficiently, they are converted into nymphæ; the cases of which are made up of the wings, legs, and other hard parts of the flies they had been feeding upon.

ICHTHOGRAPHY, in perspective, the view of any thing cut off by a plane, parallel to the horizon, just at the base of it.—The word is derived from the Greek *ichthos*, *footstep*, and *graphein*, *I write*, as being a description of the footsteps or traces of a work.

Among painters it signifies a description of images or of ancient statues of marble and copper, of busts and semi-busts, of paintings in fresco, mosaic works, and ancient pieces of miniature.

ICHOGLANS, the grand signior's pages serving in the seraglio.—These are the children of Christian parents, either taken in war, purchased, or sent in presents from the viceroys and governors of distant provinces; they are the most sprightly, beautiful, and well-made that can be met with; and are always re-

viewed and approved of by the grand signior himself, before they are admitted into the seraglios of Pera, Constantinople, or Adrianople, being the three colleges where they are educated, or fitted for employments, according to the opinion the court entertains of them.

ICHOR, properly signifies a thin watery humour like serum; but is sometimes used for a thicker kind flowing from ulcers, called also *sanies*.

ICHTHYOCOLLA, ISINGLASS, a preparation from the fish known by the name of *hufo*. See ACCIPENSER. The word is Greek, formed of *ichthys*, *fish*, and *colla*, *glue*.—The method of making Isinglass was long a secret in the hands of the Russians; but hath lately been discovered, and the following account of it published by Humphrey Jackson, Esq. in the 63d volume of the Philosophical Transactions.

"All authors who have hitherto delivered processes for making ichthyocolla, fish-glue, or isinglass, have greatly mistaken both its constituent matter and preparation.

"To prove this assertion, it may not be improper to recite what Pomet says upon the subject, as he appears to be the principal author whom the rest have copied. After describing the fish, and referring to a cut engraved from an original in his custody, he says: 'As to the manner of making the isinglass, the sinewy parts of the fish are boiled in water, till all of them be dissolved that will dissolve; then the gluey liquor is strained, and set to cool. Being cold, the fat is carefully taken off, and the liquor itself boiled to a just consistency, then cut to pieces, and made into a twist, bent in form of a crescent, as commonly sold, then hung upon a string, and carefully dried.'

"From this account, it might be rationally concluded, that every species of fish which contained gelatinous principles would yield isinglass: and this parity of reasoning seems to have given rise to the hasty conclusions of those, who strenuously vouch for the extraction of isinglass from sturgeon; but as that fish is easily procurable, the negligence of ascertaining the fact by experiment seems inexcusable.

"In my first attempt to discover the constituent parts and manufacture of isinglass, relying too much upon the authority of some chemical authors whose veracity I had experienced in many other instances, I found myself constantly disappointed. Glue, not isinglass, was the result of every process; and although, in the same view, a journey to Russia proved fruitless, yet a steady perseverance in the research proved not only successful as to this object, but, in the pursuit, to discover a refinous matter plentifully procurable in the British fisheries, which has been found by ample experience to answer similar purposes. It is now no longer a secret, that our (A) lakes and rivers in North America are stocked with immense quantities of fish, said to be the same species with those in Muscovy, and yielding the finest isinglass, the fisheries

Jehor.
Ichthyocolla.

(A) As the lakes of North America lie nearly in the same latitude with the Caspian Sea, particularly lake Superior, which is said to be of greater extent, it was conjectured they might abound with the same sorts of fish; and, in consequence of public advertisements distributed in various parts of North America, offering premiums for the fowls of sturgeon and other fish, for the purpose of making isinglass, several specimens of fine isinglass, the produce of fish taken in these parts, have been lately sent to England, with proper attestations as to the unlimited quantity which may be procured.

fisheries whereof, under due encouragement, would double the supply all Europe with this valuable article.

"No artificial heat is necessary to the production of isinglass, neither is the matter dissolved for this purpose; for, as the continuity of its fibres would be destroyed by solution, the mals would become brittle in drying, and snap short asunder, which is always the case with glue, but never with isinglass. The latter, indeed, may be resolved into glue with boiling water; but its fibrous recombination would be found impracticable afterwards, and a fibrous texture is one of the most distinguishing characteristics of genuine isinglass.

"A due consideration that an imperfect solution of isinglass, called *fining* by the brewers, possessed a peculiar property of clarifying malt-liquors, induced me to attempt its analysis in cold subacid menstrua. One ounce and an half of good isinglass, steeped a few days in a gallon of stale beer, was converted into good fining, of a remarkable thick consistence: the same quantity of glue, under similar treatment, yielded only a mucilaginous liquor, resembling diluted gum-water, which, instead of clarifying beer, increased both its tenacity and turbidness, and communicated other properties in no respect corresponding with those of genuine fining. On commixing three spoonfuls of the solution of isinglass with a gallon of malt liquor, in a tall cylindrical glass, a vast number of curdly masses became presently formed, by the reciprocal attraction of the particles of isinglass, and the feculencies of the beer, which, increasing in magnitude and specific gravity, arranged themselves accordingly, and fell in a combined state to the bottom, through the well-known laws of gravitation; for, in this case, there is no elective attraction, as some have imagined, which bears the least affinity with what frequently occurs in chemical decompositions.

"If what is commercially termed *long* or *short stapled isinglass* be steeped a few hours in fair cold water, the entwined membranes will expand, and reassume their original beautiful (a) hue, and, by a dexterous address, may be perfectly unfolded. By this simple operation, we find that isinglass is nothing more than certain membranous parts of fishes, divested of their native mucosity, rolled and twisted into the forms abovementioned, and dried in the open air.

"The founts, or air-bladders, of fresh-water fish in general, are preferred for this purpose, as being the most transparent, flexible, delicate substances. These constitute the finest sorts of isinglass; those called *book* and *ordinary staple*, are made of the intestines, and probably of the peritonæum of the fish. The belluga yields the greatest quantity, as being the largest and most plentiful fish in the Muscovy rivers; but the founts of all fresh-water fish yield, more or less, fine isinglass, particularly the smaller sorts, found in prodigious quantities in the Caspian Sea, and several hundred miles beyond Astracan, in the Wolga, Yaik, Don, and even as far as Siberia, where it is called *kle* or *kla* by the natives, which implies a glutinous matter; it is the basis of the Russian glue, which is preferred to all other kinds for its strength.

"The founts, which yields the finer isinglass, consist

of parallel fibres, and are easily rent longitudinally; but the ordinary sorts are found composed of double membranes, whose fibres cross each other obliquely, resembling the coats of a bladder: hence the former are more readily pervaded and divided with subacid liquors; but the latter, through a peculiar kind of interwoven texture, are with great difficulty torn asunder, and long resist the power of the same menstruum; yet, when duly resolved, are found to act with equal energy in clarifying liquors.

"Isinglass receives its different shapes in the following manner:

"The parts of which it is composed, particularly the founts, are taken from the fish while sweet and fresh, slit open, washed from their slimy *forders*, divested of every thin membrane which envelops the fount, and then exposed to stiffen a little in the air. In this state, they are formed into rolls about the thickness of a finger, and in length according to the intended size of the staple: a thin membrane is generally selected for the centre of the roll, round which the rest are folded alternately, and about half an inch of each extremity of the roll is turned inwards. The due dimensions being thus obtained, the two ends of what is called *short-staple* are pinned together with a small wooden peg; the middle of the roll is then pressed a little downwards, which gives it the resemblance of a heart-shape; and thus it is laid on boards, or hung up in the air to dry. The founts, which compose the long-staple, are larger than the former; but the operator lengthens this sort at pleasure, by interfolding the ends of one or more pieces of the fount with each other. The extremities are fastened with a peg, like the former; but the middle part of the roll is bent more considerably downwards; and, in order to preserve the shape of the three obtuse angles thus formed, a piece of round stick, about a quarter of an inch diameter, is fastened in each angle with small wooden pegs, in the same manner as the ends. In this state, it is permitted to dry long enough to retain its form, when the pegs and sticks are taken out, and the drying completed; lastly, the pieces of isinglass are colligated in rows, by running packthread through the peg-holes, for convenience of package and exportation.

"The membranes of the book sort, being thick and refractory, will not admit a similar formation with the preceding: the pieces therefore, after their sides are folded inwardly, are bent in the centre, in such manner that the opposite sides resemble the cover of a book, from whence its name; a peg being run across the middle, fastens the sides together, and thus it is dried like the former. This sort is interleaved, and the pegs run across the ends, the better to prevent its unfolding.

"That called *cake-isinglass*, is formed of the bits and fragments of the staple sorts, put into a flat metalline pan, with a very little water, and heated just enough to make the parts cohere like a pancake, when it is dried; but frequently it is overheated, and such pieces, as before observed, are useless in the business of fining. Experience has taught the consumers to reject them.

(a) If the transparent isinglass be held in certain positions to the light, it frequently exhibits beautiful prismatic colours.

Ichthy-
colla.

"Isinglass is best made in the summer, as frost gives it a disagreeable colour, deprives it of weight, and impairs its gelatinous principles; its fashionable forms are unnecessary, and frequently injurious to its native qualities. It is common to find oily putrid matter, and *exuvie* of insects, between the implicated membranes, which, through the inattention of the cellarman, often contaminate wines and malt-liquors in the act of clarification. These peculiar shapes might, probably, be introduced originally with a view to conceal and disguise the real substance of isinglass, and preserve the monopoly; but, as the mask is now taken off, it cannot be doubted to answer every purpose more effectually in its native state, without any subsequent manufacture whatever, especially to the principal consumers, who hence will be enabled to procure sufficient supply from the British colonies. Until this laudable end can be fully accomplished, and as a species of isinglass, more easily produceable from the marine fisheries, may probably be more immediately encouraged, it may be manufactured as follows:

"The sounds of cod and ling bear great analogy with those of the *accipenser* genus of Linnaeus and Arctedi; and are in general so well known, as to require no particular description. The Newfoundland and Iceland fishermen split open the fish, as soon as taken, and throw the back bones, with the sounds annexed, in a heap; but previous to incipient putrefaction, the sounds are cut out, washed from their slimy, and salted for use. In cutting out the sounds, the intercostal parts are left behind, which are much the best; and the Iceland fishermen are so sensible of this, that they beat the bone upon a block with a thick stick, till the pockets, as they term them, come out easily, and thus preserve the sound entire. If the sounds have been cured with salt, that must be dissolved by steeping them in water, before they are prepared for isinglass; the fresh sound must then be laid upon a block of wood, whose surface is a little elliptical, to the end of which a small hair-brush is nailed, and with a saw-knife the membranes on each side of the sound must be scraped off. The knife is rubbed upon the brush occasionally, to clear its teeth; the pockets are cut open with cissars, and perfectly cleansed of the mucous matter with a coarse cloth; the sounds are afterwards washed a few minutes in lime-water in order to absorb their oily principle, and lastly in clear water. They are then laid upon nets, to dry in the air; but if intended to resemble the foreign isinglass, the sounds of cod will only admit of that called *book*, but those of ling both shapes. The thicker the sounds are, the better the isinglass, colour excepted; but that is immaterial to the brewer, who is its chief consumer.

"This isinglass resolves into fining, like the other sorts, in subacid liquors, as stale beer, cyder, old hock, &c. and in equal quantities produces similar effects upon turbid liquors, except that it falls speedier and closer to the bottom of the vessel, as may be demonstrated in tall cylindrical glasses; but foreign isinglass retains the consistency of fining preferably in warm weather, owing to the greater tenacity of its native mucilage.

"Vegetable acids are, in every respect, best adapted to fining; the mineral acids are too corrosive, and even insalubrious, in common beverage.

Ichthy-
logy,
Ichthy-
phagi.

"It is remarkable, that, during the conversion of isinglass into fining, the acidity of the menstruum seems greatly diminished, at least to taste, not on account of any alkaline property in the isinglass, probably, but by its enveloping the acid particles. It is likewise reducible into jelly with alkaline liquors, which indeed are solvents of all animal matters; even cold lime-water dissolves it into a pulpy *magma*. Notwithstanding this is inadmissible as fining, on account of the menstruum, it produces admirable effects in other respects: for, on commixture with compositions of plaster, lime, &c. for ornamenting walls exposed to vicissitudes of weather, it adds firmness and permanency to the cement; and if common brick-mortar be worked up with this jelly, it soon becomes almost as hard as the brick itself: but, for this purpose, it is more commodiously prepared, by dissolving it in cold water, acidulated with vitriolic acid; in which case, the acid quits the jelly, and forms with the lime a *felenitic* mass, while, at the same time, the jelly being deprived in some measure of its moisture, through the formation of an indissoluble concrete amongst its parts, soon dries, and hardens into a firm body; whence its superior strength and durability are easily comprehended.

"It has long been a prevalent opinion, that sturgeon, on account of its cartilaginous nature, would yield great quantities of isinglass; but, on examination, no part of this fish, except the inner coat of the sound, promised the least success. This being full of *rugae*, adheres so firmly to the external membrane, which is useless, that the labour of separating them supercedes the advantage. The intestines, however, which in the larger fish extend several yards in length, being cleansed from their mucus, and dried, were found surprisingly strong and elastic, resembling cords made with the intestines of other animals, commonly called *cat-gut*, and, from some trials, promised superior advantages when applied to mechanic operations."

Isinglass is sometimes used in medicine; and may be given in a thin acrimonious state of the juices, after the same manner as the vegetable gums and mucilages, regard being had to their different disposition to putrefaction.

ICHTHYOLOGY, the science of fishes, or that part of zoology which treats of fishes. See FISH, and ZOOLOGY, n° 10.

ICHTHYOPHAGI, FISH-EATERS, a name given to a people, or rather to several different people, who lived wholly on fishes. The word is Greek, compounded of *εχθρο*, *pisciv*, "fish," and *φαγειν*, *edere*, "to eat."

The Ichthyophagi spoken of by Ptolemy are placed by Sanfon in the provinces of Nanquin and Xanton. Agatharides calls all the inhabitants between Carmania and Gedrosia by the name *Ichthyophagi*.

From the accounts given us of the Ichthyophagi by Herodotus, Strabo, Solinus, Plutarch, &c. it appears indeed that they had cattle, but that they made no use of them excepting to feed their fish withal. They made their houses of large fish-bones, the ribs of whales serving them for their beams. The jaws of these animals served them for doors; and the mortars wherein they pounded their fish, and baked it at the sun, were nothing else but their vertebrae.

ICH.

ichthy-
peria
entity.

Ides,
Idiocy.

ICHTHYPERIA, in Natural history, a name given by Dr Hill to the bony palates and mouths of fishes, usually met with either fossil, in single pieces, or in fragments. They are of the same substance with the bony part; and are of very various figures, some broad and short, others longer and slender; some very gibbous, and others plainly arched. They are likewise of various sizes, from the tenth of an inch to two inches in length, and an inch in breadth.

ICONOCLASTES, or ICONOCLASTÆ, breakers of images; a name which the church of Rome gives to all who reject the use of images in religious matters.—The word is Greek, formed from *εἰκων*, *imago*, and *κλαστός*, *rumpere*, “to break.”

In this sense, not only the reformed, but some of the eastern churches are called *Iconoclastes*, and esteemed by them heretics, as opposing the worship of the images of God and the saints, and breaking their figures and representations in churches.

ICOSAHEDRON, in geometry, a regular solid, consisting of 20 triangular pyramids, whose vertexes meet in the centre of a sphere supposed to circumscribe it; and therefore have their height and bases equal: wherefore the solidity of one of these pyramids multiplied by 20, the number of bases, gives the solid contents of the icosahedron.

ICOSANDRIA, (from *είκοσι*, “twenty,” and *ανδρ*, “a man, or husband;” the name of the 12th class in Linnæus’s sexual method, consisting of plants with hermaphrodite flowers, which are furnished with 20 or more stamina, that are inserted into the inner side of the calyx or petals. See BOTANY, p. 1292.

ICTINUS, a celebrated Greek architect who lived about 430 B. C. built several magnificent temples, and among others that of Minerva at Athens.

IDA, (anc. geog.) a mountain situated in the heart of Crete where broadest; the highest of all in the island; round, and in compass 60 stadia, (Strabo); the nursing-place of Jupiter, and where his tomb was visited in Varro’s time. Another *Ida*, a mountain of Mysia, or rather a chain of mountains (Homer, Virgil), extending from Zeleia on the south of the territory of Cygicus to Lectum the utmost promontory of Troas. The top was called *Gargara*, (Homer, Strabo); and celebrated by the poets for the judgment of Paris on the beauty of the three goddesses, Minerva, Juno, and Venus, to the last of whom he gave the preference.

IDALIUM, (anc. geog.) a promontory on the east side of Cyprus. Now *Capo di Griego*; with a high rugged eminence rising over it, in the form of a table. It was sacred to Venus; and hence the epithet *Idalia* given her by the poets. The eminence was covered with a grove; and in the grove was a little town, in Pliny’s time extinct. *Idalia*, according to Bochart, denotes the place or spot sacred to the goddess.

IDEA, the reflex perception of objects, after the original perception or impression has been felt by the mind. See METAPHYSICS, *passim*; and LOGIC, Part I.

IDENTITY, denotes that by which a thing is itself, and not any thing else; in which sense identity differs from *similitude*, as well as *diversity*. See METAPHYSICS, n° 105;—120.

IDES, in the ancient Roman calendar, were eight days in each month; the first of which fell on the 15th of March, May, July, and October; and on the 13th day of the other months.—The origin of the word is contested. Some will have it formed from *idui*, “to see;” by reason the full moon was commonly seen on the day of the ides; others from *idus*, “species, figure;” on account of the image of the full moon then visible; others from *idulium*, or *ovis idalis*, a name given by the Hetrurians to a victim offered on that day to Jupiter; others from the Hetrurian word *iduo*, i. e. *divido*; by reason the ides divided the moon into two nearly equal parts.

The ides came between the KALENDS and the NONES; and were reckoned backwards. Thus they called the 14th day of March, May, July, and October, and the 12th of the other months, the *pridie idus*, or the day before the ides; the next preceding day they called the *tertia idus*; and so on, reckoning always backwards, till they came to the NONES. This method of reckoning time is still retained in the chancery of Rome, and in the calendar of the Breviary.—The ides of May were consecrated to Mercury: the ides of March were ever esteemed unhappy, after Cæsar’s murder on that day: the time after the ides of June was reckoned fortunate for those who entered into matrimony: the ides of August were consecrated to Diana, and were observed as a feast-day by the slaves. On the ides of September, auguries were taken for appointing the magistrates, who formerly entered into their offices on the ides of May, afterwards on those of March.

IDIOCY, a defect of understanding. Both idiocy and LUNACY excuse from the guilt of crimes; (see CRIME, *par. ult.*) For the rule of law as to lunatics, which also may be easily adapted to idiots, is, that *furiosus furorẽ solum punitur*. In criminal cases, therefore, idiots and lunatics are not chargeable for their own acts, if committed when under these incapacities; no, not even for treason itself. Also, if a man in his sound memory commits a capital offence, and before arraignment for it he becomes mad, he ought not to be arraigned for it; because he is not able to plead to it with that advice and caution that he ought. And if, after he has pleaded, the prisoner becomes mad, he shall not be tried: for how can he make his defence? If, after he be tried and found guilty, he loses his senses before judgment, judgment shall not be pronounced; and if, after judgment, he becomes of nonsane memory, execution shall be stayed: for, peradventure, says the humanity of the English law, had the prisoner been of sound memory, he might have alleged something in stay of judgment or execution. Indeed, in the bloody reign of Henry VIII. a statute was made, which enacted, that if a person, being *compos mentis*, should commit high treason, and after fall into madness, he might be tried in his absence, and should suffer death, as if he were of perfect memory. But this savage and inhuman law was repealed by the statute 1 & 2 Ph. & M. c. 10. For, as is observed by Sir Edward Coke, “the execution of an offender is for example, *ut pœna ad paucos, metus ad omnes perveniat*; but so it is not when a madman is executed; but should be a miserable spectacle, both against law, and of extreme inhumanity and cruelty, and can be no

Blackst.
Comments

Idiocy.

no example to others." But if there be any doubt whether the party be *compos* or not, this shall be tried by a jury. And if he be so found, a total idiocy, or absolute insanity, excuses from the guilt, and of course from the punishment, of any criminal action committed under such deprivation of the senses: but if a lunatic hath lucid intervals of understanding, he shall answer for what he does in those intervals, as if he had no deficiency. Yet, in the case of absolute madmen, as they are not answerable for their actions, they should not be permitted the liberty of acting unless under proper control; and, in particular, they ought not to be suffered to go loose, to the terror of the king's subjects. It was the doctrine of our ancient law, that persons deprived of their reason might be confined till they recovered their senses, without waiting for the forms of a commission or other special authority from the crown: and now, by the vagrant acts, a method is chalked out for imprisoning, chaining, and sending them to their proper homes.

The matrimonial contract likewise cannot take place in a state of idiocy. It was formerly adjudged, that the issue of an idiot was legitimate, and his marriage valid. A strange determination! since consent is absolutely requisite to matrimony, and neither idiots nor lunatics are capable of consenting to any thing. And therefore the civil law judged much more sensibly, when it made such deprivations of reason a previous impediment, though not a cause of divorce if they happened after marriage. And modern resolutions have adhered to the sense of the civil law, by determining that the marriage of a lunatic, not being in a lucid interval, was absolutely void. But as it might be difficult to prove the exact state of the party's mind at the actual celebration of the nuptials, upon this account, (concurring with some private family-reasons *) the statute 15 Geo. II. c. 30. has provided, that the marriage of lunatics and persons under phrenzies (if found lunatics under a commission, or committed to the care of trustees under any act of parliament) before they are declared of sound mind by the lord chancellor, or the majority of such trustees, shall be totally void.

Idiots, and persons of nonsane memory, as well as infants, and persons under durels, are not totally disabled either to convey or purchase, but *sub modo* only. For their conveyances and purchases are voidable, but not actually void. The king, indeed, on behalf of an idiot, may avoid his grants or other acts. But it hath been said, that a *non compos* himself, though he be afterwards brought to a right mind, shall not be permitted to allege his own insanity in order to avoid such grant: for that no man shall be allowed to fluster himself, or plead his own disability. The progress of this notion is somewhat curious. In the time of Edward I. *non compos* was a sufficient plea to avoid a man's own bond: and there is a writ in the register for the alienor himself to recover lands aliened by him during his insanity; *dum fuit non compos mentis sue, ut dicitur, &c.* But under Edward III. a scruple began to arise, whether a man should be permitted to *blenish* himself, by pleading his own insanity: and, afterwards, a defendant in assize having pleaded a release by the plaintiff since the last continuance, to which the plaintiff replied (*ore tenus*, as the manner then was) that he was

out of his mind when he gave it, the court adjourned the assize; doubting, whether as the plaintiff was sane both then and at the commencement of the suit, he should be permitted to plead an intermediate deprivation of reason; and the question was asked, how he came to remember to release, if out of his senses when he gave it? Under Henry VI. this way of reasoning (that a man shall not be allowed to disable himself, by pleading his own incapacity, because he cannot know what he did under such a situation) was seriously adopted by the judges in argument; upon a question, whether the heir was barred of his right of entry by the feoffment of his insane ancestor. And from these loose authorities, which Fitzherbert does not scruple to reject as being contrary to reason, the maxim that a man shall not fluster himself hath been handed down as settled law: though later opinions, feeling the inconvenience of the rule, have in many points endeavoured to restrain it. And, clearly, the next heir, or other person interested, may, after the death of the idiot or *non compos*, take advantage of his incapacity and avoid the grant. And so too, if he purchases under this disability, and does not afterwards upon recovering his senses agree to the purchase, his heir may either waive or accept the estate at his option. In like manner, an infant may waive such purchase or conveyance, when he comes to full age; or, if he does not then actually agree to it, his heirs may waive it after him. Persons also, who purchase or convey under durels, may affirm or avoid such transaction, whenever the durels is ceased. For all these are under the protection of the law; which will not suffer them to be imposed upon thro' the imbecility of their present condition; so that their acts are only binding, in case they be afterwards agreed to when such imbecility ceases. Yet the guardians or committees of a lunatic, by the statute 11 Geo. III. c. 20. are empowered to renew in his right, under the directions of the court of chancery, any lease for lives or years, and apply the profits of such renewal for the benefit of such lunatic, his heirs, or executors *.

IDIOM, among grammarians, properly signifies the peculiar genius of each language, but is often used in a synonymous sense with dialect.

IDIOPATHY, in physic, a disorder peculiar to a certain part of the body, and not arising from any preceding disease, in which sense it is opposed to sympathy. Thus, an epilepsy is idiopathic when it happens merely through some fault in the brain; and sympathetic when it is the consequence of some other disorder.

IDIOSYNCRASY, among physicians, denotes a peculiar temperament of body, whereby it is rendered more liable to certain disorders than persons of a different constitution usually are.

IDLENESS, a reluctance in people to be employed in any kind of work.

Idleness in any person whatsoever is a high offence against the public economy. In China it is a maxim, that if there be a man who does not work, or a woman that is idle, in the empire, somebody must suffer cold or hunger: the produce of the lands not being more than sufficient, with culture, to maintain the inhabitants; and therefore, though the idle person may shift off the want from himself, yet it must in the end fall somewhere. The court also of Arcopagus at

Idiom
||
Idleness

* See Private Acts
23 Geo. II.
c. 6.

* See LUNACY.

Athens punished idlers, and exerted a right of examining every citizen in what manner he spent his time; the intention of which was, that the Athenians, knowing they were to give an account of their occupations, should follow only such as were laudable, and that there might be no room left for such as lived by unlawful arts. The civil law expelled all sturdy vagrants from the city: and, in our own law, all idle persons or vagabonds, whom our ancient statutes describe to be "such as wake on the night, and sleep on the day, and haunt customable taverns, and ale-houses, and routs about; and no man wot from whence they come, ne whether they go;" or such as are more particularly described by statute 17 Geo. II. c. 5. and divided into three classes, *idle and disorderly persons*, *rogues and vagabonds*, and *incorrigible rogues*;—all these are offenders against the good order, and blemishes in the government, of any kingdom. They are therefore all punished, by the statute last mentioned; that is to say, idle and disorderly persons with one month's imprisonment in the house of correction; rogues and vagabonds with whippings, and imprisonment not exceeding six months; and incorrigible rogues with the like discipline, and confinement not exceeding two years: the breach and escape from which confinement in one of an inferior class, ranks him among incorrigible rogues; and in a rogue (before incorrigible) makes him a felon, and liable to be transported for seven years. Persons harbouring vagrants are liable to a fine of forty shillings, and to pay all expences brought upon the parish thereby: in the same manner as, by our ancient laws, whoever harboured any stranger for more than two nights, was answerable to the public for any offence that such his inmate might commit.

IDOL, in pagan theology, an image, or fancied representation of any of the heathen gods.—This image, of whatever materials it consisted, was, by certain ceremonies called *consecration*, converted into a god. While under the artificer's hands, it was only a mere statue. Three things were necessary to turn it into a god; proper ornaments, consecration, and oration. The ornaments were various, and wholly designed to blind the eyes of the ignorant and stupid multitude, who are chiefly taken with shew and pageantry. Then followed the consecration and oration, which were performed with great solemnity among the Romans.

IDOLATRY, or the worship of idols, may be distinguished into two sorts. By the first, men adore the works of God, the sun, the moon, the stars, angels, demons, men and animals: by the second, men worship the work of their own hands, as statues, pictures, and the like: and to these may be added a third, that by which men have worshipped the true God under sensible figures and representations. This indeed may have been the case with respect to each of the above kinds of idolatry; and thus the Israelites adored God under the figure of a calf.

The stars were the first objects of idolatrous worship, on account of their beauty, their influence on the productions of the earth, and the regularity of their motions, particularly the sun and moon, which are considered as the most glorious and resplendent images of the Deity: afterwards, as their sentiments became more corrupted, they began to form images,

and to entertain the opinion, that by virtue of consecration, the gods were called down to inhabit or dwell in their statues. Hence Arnobius takes occasion to rally the pagans for guarding so carefully the statues of their gods, who, if they were really present in their images, might have their worshippers the trouble of securing them from thieves and robbers.

As to the adoration which the ancient pagans paid to the statues of their gods, it is certain, that the wiser and more sensible heathens considered them only as simple representations or figures designed to recal to their minds the memory of their gods. This was the opinion of Varro and Seneca: and the same sentiment is clearly laid down in Plato, who maintains, that images are inanimate, and that all the honour paid to them has respect to the gods whom they represent. But as to the vulgar, they were stupid enough to believe the statues themselves to be gods, and to pay divine worship to stocks and stones.

Soon after the flood, idolatry seems to have been the prevailing religion of all the world; for wherever we cast our eyes at the time of Abraham, we scarcely see any thing but false worship and idolatry. And it appears from Scripture, that Abraham's forefathers, and even Abraham himself, were for a time idolaters.

The Hebrews were indeed expressly forbidden to make any representation of God; they were not so much as to look upon an idol: and from the time of the Maccabees to the destruction of Jerusalem, the Jews extended this precept to the making the figure of any man: by the law of Moses, they were obliged to destroy all the images they found, and were forbidden to apply any of the gold or silver to their own use, that no one might receive the least profit from any thing belonging to an idol. Of this the Jews, after they had smited for their idolatry, were so sensible, that they thought it unlawful to use any vessel that had been employed in sacrificing to a false god, to warm themselves with the wood of a grove after it was cut down, or to shelter themselves under its shade.

But the preaching of the Christian religion, wherever it prevailed, entirely rooted out idolatry; as did also that of Mahomet, which is built on the worship of one God. It must not, however, be forgotten, that the Protestant Christians charge those of the church of Rome with paying an idolatrous kind of worship to the pictures or images of saints and martyrs: before these, they burn lamps and wax-candles; before these, they burn incense, and, kneeling, offer up their vows and petitions: they, like the Pagans, believe that the saint to whom the image is dedicated, presides in a particular manner about its shrine, and works miracles by the intervention of its image; and that if the image was destroyed or taken away, the saint would no longer perform any miracle in that place.

IDYLLION, in ancient poetry, is only a diminutive of the word *εἶνος*, and properly signifies any poem of moderate extent, without considering the subject. But as the collection of Theocritus's poems were called *idyllia*, and the pastoral pieces being by far the best in that collection, the term *idyllion* seems to be now appropriated to pastoral pieces.

JEARS, or GEERS, in the sea-language, an assemblage.

Idol,
olatry.

Idyl.
Idyllion.

Jebusæi
Jeffreys.

blage of tackles, by which the lower yards of a ship are hoisted along the mast to their usual station, or lowered from thence as occasion requires; the former of which operations is called *swaying*, and the latter *striking*.

JEBUSÆI, one of the seven ancient people of Canaan, descendants of Jebusi, Canaan's son; so warlike and brave, as to have flooded their ground, especially in Jebus, afterwards called *Jerusalem*, down to the time of David. Judges i. 21. 1 Sam. v. 6.

JEDBURGH, a town of Scotland, capital of Tiviotdale or Roxburghshire. It is well-built and populous, with a handsome church and town-hall, and a good market for corn and cattle. It gives the title of *lord* to the marquis of Lothian's eldest son, and is the seat of the sheriff's court and presbytery.

JEDDO, the capital town or city of the islands of Japan, where the emperor resides. It is open on all sides, having neither walls nor ramparts; and the houses are built with earth, and boarded on the outside to prevent the rain from destroying the walls. In every street there is an iron gate, which is shut up in the night; and a kind of custom-house or magazine, to put merchandizes in. It is a large place, being nine miles in length and six in breadth, and contains 1,000,000 of inhabitants. A fire happened in 1658, which, in the space of 48 hours, burnt down 100,000 houses, and in which a vast number of the inhabitants perished. The emperor's palace and all the rest were reduced to ashes; but they are all rebuilt again. The royal palace is in the middle of the town; and is defended with walls, ditches, towers, and bastions. Where the emperor resides, there are three towers nine stories high, each covered with plates of gold; and the hall of audience is said to be supported by pillars of massy gold. Near the palace are several others, where the relations of the emperor live. The empress has a palace of her own, and there are 20 small ones for the concubines. Besides, all the vassal kings have each a palace in the city, with a handsome garden, and stables for 2000 horses. The houses of the common sort are nothing but a ground-floor, and the rooms are parted by folding-screens; so that they can make the rooms larger or smaller at pleasure. It is seated in an agreeable plain, at the bottom of a fine bay; and the river which crosses it, is divided into several canals. E. Long. 140. 0. N. Lat. 35. 32.

JEFFERY. See **GEOFFREY**.

JEFFREYS (lord George), baron Wem, commonly called *Judge Jeffreys*, was the sixth son of John Jeffreys, Esq; of Acton in Denbighshire; and was educated at Westminster-school, whence he removed to the Inner Temple, where he applied himself to the study of the law. Alderman Jeffreys, who was probably related to him, introduced him among the citizens of London; and he being a merry bottle-companion, soon came into great business, and was chosen their recorder. He was afterwards chosen solicitor to the duke of York; and in 1680 was knighted, and made chief-justice of Chester. At length, resigning the recordership, he obtained the post of chief-justice of the king's-bench, and, soon after the accession of James II. the great seal. During the reign of king Charles II. he shewed himself a bitter enemy to

Jeffreys.

those dissenting ministers who, in that time of persecution, were tried by him: he was one of the greatest advisers and promoters of all the oppressions and arbitrary measures carried on in the reign of James II.; and his sanguinary and inhuman proceedings against Monmouth's unhappy adherents in the west will ever render his name infamous. Whenever the prisoner was of a different party, or he could please the court by condemning him, instead of appearing according to the duty of his office, as his counsel, he would scarce allow him to speak for himself; but would load him with the grossest and most vulgar abuse, browbeat, insult, and turn to ridicule the witnesses that spoke in his behalf; and even threaten the jury with fines and imprisonment, if they made the least hesitation about bringing in the prisoner guilty. Yet it is said, that when he was in temper, and matters perfectly indifferent came before him, no one became a feat of justice better. Nay, it even appears, that, when he was under no state-influence, he was sometimes inclined to protect the natural and civil rights of mankind, of which the following instance has been given:—The mayor and aldermen of Bristol had been used to transport convicted criminals to the American plantations, and sell them by way of trade. This turning to good account, when any pilferers or petty rogues were brought before them, they threatened them with hanging; and then some officers who attended, earnestly persuaded the ignorant intimidated creatures to beg for transportation, as the only way to save them; and in general their advice was followed. Then, without more form, each alderman in course took one, and sold him for his own benefit; and sometimes warm disputes arose between them about the next turn. This infamous trade, which had been carried on many years, coming to the knowledge of the lord chief justice, he made the mayor descend from the bench, and stand at the bar in his scarlet and furr, with his guilty brethren the aldermen, and plead as common criminals. He then obliged them to give securities to answer informations; but the proceedings were stopped by the Revolution.

However, the brutality Jeffreys commonly shewed on the bench, where his voice and visage were equally terrible, at length exposed him to a severe mortification. A scrivener of Wapping having a cause before him, one of the opponent's counsel said he was a strange fellow, and sometimes went to church, and sometimes to conventicles; and it was thought he was a trimmer. At this the chancellor fired: "A trimmer? (said he); I have heard much of that monster, but never saw one. Come forth, Mr Trimmer, and let me see your shape." He then treated the poor fellow so roughly, that, on his leaving the hall, he declared he would not undergo the terrors of that man's face again to save his life, and he should certainly retain the frightful impressions of it as long as he lived. Soon after, the prince of Orange coming, the lord-chancellor, dreading the public repentment, disguised himself in a seaman's dress, in order to leave the kingdom; and was drinking in a cellar, when this scrivener coming into the cellar, and seeing again the face which had filled him with such horror, started; on which, Jeffreys, fearing he was known, feigned a cough, and turned to the wall with his pot of beer in his hand.

But

But Mr Trimmer going out, gave notice that he was there; and the mob rushing in, seized him, and carried him before the lord-mayor, who sent him with a strong guard to the lords of the council, by whom he was committed to the Tower, where he died in 1689. — It is remarkable, that the late countess of Pomfret met with very rude insults from the populace on the western road, only because she was grand-daughter of the inhuman Jeffries.

JEHOVAH, one of the scripture-names of God, signifying the Being who is self-existent and gives existence to others.

So great a veneration had the Jews for this name, that they left off the custom of pronouncing it, whereby its true pronunciation was forgotten. They call it *tetragrammaton*, or “the name with four letters;” and believe, that whoever knows the true pronunciation of it cannot fail to be heard by God.

JEJUNUM, in anatomy, the name of one of the small intestines. See *ANATOMY*, n° 354. g.

JELLY. See *GELLY*, and *CHEMISTRY*, n° 521.

JEMTERLAND, a province of Sweden, bounded on the north by Angermania, on the east by Medelpadia, on the south by Helsingia, and on the west by Norway. It is full of mountains; and the principal towns are Refundt, Lich, and Docra.

JENA, a strong town of Germany, in the circle of Upper Saxony, and in Thuringia, with an university. It is seated on the river Sala, in E. Long. 2. 59. N. Lat. 51. o.

JENCAPORE, a town of Asia, in Indostan, and in the dominions of the Great Mogul, capital of a territory of the same name. It is seated on the river Chaul, in E. Long. 76. 25. N. Lat. 30. 30.

JENISA, a river of the Russian empire, that runs from north to south through Siberia, and falls into the Frozen Ocean.

JENISKOL, a town of the Russian empire, in Siberia, seated on the river Jenif. It is large, populous, and pretty strong; and there are villages for several miles round it. It is subject to the Tungusians, who are pagans, and chiefly live on the above river. They pay a tribute to the emperor for every bow, reckoning a man and a woman for one. The climate is extremely cold; and no other fruits grow there but black and red currants, strawberries, and gooseberries. Corn, butchers meat, and wild fowls, are very cheap. E. Lon. 86. 25. N. Lat. 58. 40.

JENCOPING, a town of Sweden, in the province of Smland, seated on the south side of the lake Welter, with a strong citadel. The houses are all built with wood. E. Long. 14. 20. N. Lat. 57. 22.

JENKIN (Robert), a learned English divine in the 18th century, was bred at Cambridge, became master of St John's college, and wrote several books much esteemed, viz. 1. An historical examination of the authority of General Councils, 4to. 2. The reasonableness and certainty of the Christian religion, 2 vols 8vo. 3. *Defensio S. Augustini*. This book is written against M. le Clerc. 4. Remarks on some books lately published, viz. Mr Whiston's eight sermons, Locke's paraphrase, &c. 5. A translation from the French of the life of Apollonius Tyaneus.

JENKINS (Henry). See *LONGEVITY*.

JENKINS (Sir Leoline), a learned civilian and able

VOL. V.

statesman of the last century, born in Glamorganshire about the year 1623. Being rendered obnoxious to the parliament during the civil war by adhering to the king's cause, he consulted his safety by flight; but returning on the restoration, he was admitted an advocate in the court of arches, and succeeded Dr Exton as judge. When the queen-mother Henrietta died in 1669 at Paris, her whole estate, real and personal, was claimed by her nephew Lewis XIV.: upon which Dr Jenkins's opinion being called for and approved, he went to Paris, with three others joined with him in a commission, and recovered her effects; for which he received the honour of knighthood. He officiated as one of the mediators at the treaty of Nimeguen, in which tedious negotiation he was engaged about four years and a half; and was afterwards made a privy-counsellor and secretary of state. He died in 1685; and as he never married, bequeathed his whole estate to charitable uses: he was to great a benefactor to Jesus-college Oxford, that he is generally looked on as the second founder. All his letters and papers were collected and printed in 1724, in 2 vols folio.

JENNY-WREN, a name given by writers on long-birds to the wren. See *WREN*.

JEFOAILE, (compounded of three French words, *Jay faille*, “I have failed”), a term in law, used for an oversight in pleading or other proceedings at law.

The shewing of these defects or oversights was formerly often practised by the counsel; and when the jury came into court in order to try the issue, they said, This inquest you ought not to take; and after verdict they would say to the court, To judgment you ought not to go. But several statutes have been made to avoid the delays occasioned by such suggestions; and a judgment is not to be stayed after verdict for mistaking the Christian or surname of either of the parties, or in a sum of money, or in the day, month, year, &c. where the same are rightly named in any preceding record.

JEREMIAH (*the Prophecy of*), a canonical book of the Old Testament. This divine writer was of the race of the priests, the son of Hilkiah of Anathoth, of the tribe of Benjamin. He was called to the prophetic office when very young, about the 13th year of Josiah, and continued in the discharge of it about 40 years. He was not carried captive to Babylon with the other Jews, but remained in Judea to lament the desolation of his country. He was afterwards a prisoner in Egypt with his disciple Baruch, where it is supposed he died in a very advanced age. Some of the Christian fathers tell us he was stoned to death by the Jews, for preaching against their idolatry; and some say he was put to death by Pharaoh Hophrah, because of his prophecy against him. Part of the prophecy of Jeremiah relates to the time after the captivity of Israel, and before that of Judah, from the first chapter to the 44th; and part of it was in the time of the latter captivity, from the 44th chapter to the end. The prophet lays open the sins of Judah with great freedom and boldness, and reminds them of the severe judgments which had befallen the ten tribes for the same offences. He passionately laments their misfortune, and recommends a speedy reformation to them. Afterwards he predicts the grievous calamities that were approaching, particularly the 70 years captivity in Chaldaea. He like-

wife foretells their deliverance and happy return, and the recompence which Babylon, Moab, and other enemies of the Jews, should meet with in due time. There are likewise several intimations in this prophecy concerning the kingdom of the Messiah; also several remarkable visions, and types, and historical passages relating to those times. The 52d chapter does not belong to the prophecy of Jeremiah, which probably was added by Ezra, and contains a narrative of the taking of Jerusalem, and of what happened during the captivity of the Jews, to the death of Jeconias. St Jerom has observed upon this prophet, that his style is more easy than that of Isaiah and Hosea; that he retains something of the rusticity of the village where he was born; but that he is very learned and majestic, and equal to those two prophets in the sense of his prophecy.

JERICOHO, or HIERICHUS, (anc. *geog.*) a city of Judea; situated between Jordan and Jerusalem, at the distance of 150 stadia from the latter, and 60 from the former. Josephus says the whole space from Jerusalem is desert and rocky, and equally barren and uncultivated from Jericho to the lake Asphaltites; yet the places near the town and above it are extremely fertile and delicious, so that it may be justly called a *divine plain*, surpassing the rest of the land of Canaan, no unfruitful country, and surrounded by hills in the manner of an amphitheatre. It produces opobalsamum, myrobalsams, and dates; from the last of which it is called the *city of palm-trees*, by Moses.

JERIMOTH. See JARIMUTH.

JEROME (St), in Latin *Hieronymus*, a famous doctor of the church, and the most learned of all the Latin fathers, was the son of Eusebius; and was born at Stridon, a city of the ancient Pannonia, about the year 340. He studied at Rome under Donatus, the learned grammarian. After having received baptism, he went into Gaul, and there transcribed St Hilary's book de *Synodus*. He then went into Aquileia, where he contracted a friendship with Heliodorus, who prevailed on him to travel with him into Thrace, Pontus, Bithynia, Galatia, and Cappadocia. In 372 St Jerome retired into a desert in Syria, where he was persecuted by the orthodox of Melitius's party, for being a Sabellian, because he made use of the word *Hypostasis*, which had been used by the council of Rome in 369. This obliged him to go to Jerusalem; where he applied himself to the study of the Hebrew language, in order to receive a more perfect knowledge of the Holy Scriptures; and about this time he consented to be ordained, on condition that he should not be confined to any particular church. In 381, he went to Constantinople to hear St Gregory of Nazianzen; and the following year returned to Rome, where he was made secretary to pope Damasus. He then instructed many Roman ladies in piety and the knowledge of the sciences, which exposed him to the calumnies of those whom he zealously reprov'd for their irregularities; and pope Siricius not having all the esteem for him which his learning and virtue justly entitled him to, this learned doctor left Rome, and returned to the monastery of Bethlehem, where he employed himself in writing against those whom he called *heretics*, especially against Vigilantius and Jovinian. He had a quarrel with John of Jerusalem, and Rufinus, about the Origenists. He was the first who wrote against Pelagius; and died on

the 30th of September, 420, at about 80 years of age. There have been several editions of his works; the last, which is that of Verona, is in 11 vols folio. His principal works are, 1. A Latin version of the Holy Scriptures, distinguished by the name of the *Vulgate*. 2. Commentaries on the Prophets, Ecclesiastes, St Matthew's Gospel, and the Epistle to the Galatians, Ephesians, Titus, and Philemon. 3. Polemical treatises against Montanus, Helvidius, Jovinian, Vigilantius, and Pelagius. 4. Several letters. 5. A treatise on the lives and writings of the ecclesiastical authors who had flourished before his time.—St Jerome's style is lively and animated, and sometimes sublime.

JEROME of Prague, so called from the place of his birth, in Bohemia. He was neither a monk nor clergyman, but had a learned education. Having embraced the opinions of John Hus, he began to propagate them in the year 1480. In the mean time the council of Nice kept a watchful eye over him, and considering him as a dangerous person, cited him to appear before them and give an account of his faith. In obedience to this citation, he went to Constance; but on his arrival, in 1415, finding Hus in prison, he set out for his own country. Being seized however on the way, imprisoned, and examined, he was so intimidated, that he retracted, and pretended to approve of the condemnation of Wickliff's and Hus's opinions; but on the 26th of May, 1416, he condemned that recantation in these terms: "I am not ashamed to confess here publicly my weakness. Yes, with horror I confess my base cowardice. It was only the dread of the punishment by fire which drew me to consent, against my conscience, to the condemnation of the doctrine of Wickliff and Hus." Accordingly sentence was passed on him; in pursuance of which he was delivered to the secular arm, and burnt in 1416. He was a person of great parts, learning, and elocution.

JERSEY, an island in the English channel, believed to be the island called in the Itinerary *Cesarea*, in succeeding times *Augia*, by us *Gersey*, more frequently *Jersey*. It is situated 25 leagues south from the continent of Britain; five leagues west from Cape Carteret in Normandy; three leagues south from Sarke; seven leagues, according to the common computation, south-east from Guernsey, but in reality not so much; and nine leagues south from Alderney. It is of an oblong figure, measuring 12 miles from west to east, and six from north to south; in circumference between 35 and 36; and, in point of extent, nearly equal to, or rather somewhat larger than, Guernsey: elevated like that; but on the opposite side declining from south to north, the cliffs on that side which looks towards Guernsey being 40 or 50 fathom in height, whereas on the south it is in a manner level with the sea. Hence the distance between St Peter's and St Helier's is really seven leagues, though the islands have not above four leagues of sea between them. The people of Jersey think, that from this elevation, they have a great advantage in point of climate; that their summers are warmer, and that their corn and fruits ripen better. The country is beautifully diversified with little hills, warm valleys, and, towards the sea, with pleasant plains. The soil also varies very much; in some places gravelly, in others sandy: but the greatest part is a deep, rich, fertile mould; and there is hardly any part of the island that

that can be styled barren. It is also thought to be better watered than Guernsey, abounding every where with rills, rivulets, and living springs; so that there are between 30 and 40 corn-mills driven by water, exclusive of seven fulling, and several windmills. The produce of this island is much the same with that of Guernsey; their pasture is so sweet, that no country in Europe can boast of richer milk or finer butter; and they have grain of all kinds, and particularly a sort of wheat called *froment-tremais*, from its being sown in the latter end of May, and reaped in the beginning of August. But what chiefly distinguishes this island at present, is its orchards; which are very well fenced, regularly planted, and yield commonly immense quantities of fruit.

On the south of the island the sea seems to have encroached upon the land, (which, as we have before observed, declines on that side), and to have swallowed upwards of six square miles, making a very beautiful bay of between two and three miles broad, and near the same in depth. In the east corner of this bay stands the town of St Helier, very happily situated, having a prospect open to the sea and Mount Elisabeth Castle (which, since it was repaired and the works augmented in the reign of Charles II. entirely occupies a rocky isle, which the sea, when it devoured the soil, could not digest), covered with hills to the north, with meadows between them and the town, through which runs a copious and delightful stream that waters the place as well as can be wished. The streets are open and well-built, with a handsome square in the centre, and well accommodated in point of markets, and every thing that can contribute to the convenience of the inhabitants, of whom there may be about 2000. There has been of late years a pier raised; which is a great advantage to the port, and of course not a little to the benefit of the town. But the principal haven is on the other side, in the western corner of the bay, which receives its name from it, being called *St Aubin's*. It is about half the size of St Helier, chiefly occupied by merchants and masters of ships; and most of the buildings being new, make a very neat and elegant figure. A little to the eastward of the town a rock rises up in the sea, upon which the fort of St Aubin is erected; to which the inhabitants having joined a strong, well-built pier, their haven is now equally secured against the fury of the winds, and the insults of an enemy. Within the pier, a sixth-rate just floats at a dead neap, and a vessel of 200 tons at all times; but ships of superior size must lie without, in the road, where there is good anchoring; and the whole bay being a fine, clean, hard sand, renders the intercourse between the two towns, which are about three miles distant, perfectly easy. There are, besides these, several other havens of less note; as, St Brelade's Bay, at the back of St Aubin's; the great bay of St Ouen, which takes in the greatest part of the west side of the island, where the largest ships may ride in 12 and 15 fathom, safe from all but east winds. La Crevaile is a port only for boats; Greve de Lecq and port St John are also small havens on the north side, where is likewise Bonnevuit. On the east there is the bay of St Catherine, and the harbour of Rosel; to the south of which lies the famous Mount Orgueil Castle, formerly Castle Courray, upon a solid rock, which was entirely covered with its

out-works; once the glory of this isle, and still majestic though in decay. To the south-west lies the haven de la Chauffée. The last we shall mention is the port de Pas, a very little to the eastward of St Aubin's bay. All these are covered with breast-works, well defended by cannon.

The state of things and the occupations of the people are very much changed from what they were a century past, or a very little more. The country then was in a manner altogether arable or pasture, and the people in general applied themselves to agriculture: whereas now every house has its orchards; and these orchards are so fenced with strong and thick mounds of earth and stone, frequently surmounted by hedges, and sometimes by trees, that it has been thought, not by transient spectators, but even on reflection affirmed by the most competent judges, these inclosures, together with larger or lesser roads, take up not less than a third part of the surface of the island; and they have such an abundance of fruit, that it is believed in a good year they make between 20,000 and 30,000 hog-heads of cyder; and if we consider that this is the common drink of the inhabitants, we may easily acquiesce in the account. Their great manufacture is the same with that of Guernsey, the working up of their own wool, and that which by two acts of parliament they are allowed to import from England, which is 4000 tods; and some say that 10,000 pair of stockings, of all sorts and sizes, are brought weekly to the market of St Helier. In ancient times they depended greatly upon their fishery, in which they are much inferior at present to Guernsey: but whereas they had formerly larger ships, and a greater share of commerce, that is now in the hands of the people of Jersey, who send annually 30 stout ships to the Newfoundland fishery; and in time of peace, great quantities of tobacco are smuggled from thence into France. For the defence of the island they have two troops of horse, five regiments of infantry, and a fine train of artillery, exclusive of what is in their several castles, and on the redoubts and breast-works upon their coasts, amounting in the whole to 115 18-pounders, given by King William to the island in 1692. There are always regular troops in Elizabeth Castle and in Fort St Aubin; and in time of war, they have commonly a body of forces from England. The whole number of inhabitants is computed at about 25,000, all of whom are (except a very few) natives of the place.

The island of Jersey, with those of Guernsey, Sark, Alderney, and their appendages, were parcel of the duchy of Normandy, and were united to the crown of England by the first princes of the Norman line. They are governed by their own laws, which are for the most part the dual customs of Normandy, being collected in an ancient book of customs intitled *Le grand coutumier*. The king's writ, or process from the courts of Westminster, is here of no force; but his commission is. They are not bound by any common acts of our parliaments, unless particularly named. All causes are originally determined by their own officers, the bailiffs and jurats of the islands. But an appeal lies from them to the king and counsel in the last resort.

NEW JERSEY, or, as it is commonly called, *the Jerseys* (being two provinces united into one government),

Jersey,
Jerusalem.

ment), one of the British colonies in North America. They lie from 39 to 41 degrees of north latitude, and from 74 to 75 degrees 30 minutes longitude west from London. In length 150 miles, in breadth in some places about 100. Bounded on the north by New York, on the east by the Atlantic, on the south by Delaware Bay, on the west by Pennsylvania. This situation, and their having on all sides either the sea or cultivated countries, accounts for the mildness of the climate, which is equally serene and pleasant. The soil is almost every-where deep and fertile, producing vast quantities of excellent wheat and all other kinds of grain in abundance, a variety of rich fruits, fine timber-trees fit for building, and prodigious quantities of cattle of all sorts. Abounding also in copper and iron ores, which are very rich. The inhabitants live here much at their ease, and with little labour, enjoying not only all the necessaries but most of the conveniences of life, from whence this country hath not been improperly styled the *Garden of America*. It is a royal government, the governor being assisted by a council of 12 which compose the upper house, as the representatives of the people do the lower house of assembly, and are in number 24. In East Jersey, the capital is Perth Amboy, which hath a fine port, notwithstanding which Elizabeth-Town is much larger. In West Jersey they have two ports, Burlington and Salem. The commodities of the Jerseys are the same with those of New York, and the number of inhabitants is said to be 60,000.

The duke of York, as proprietor of the province last mentioned, by a deed, dated the 24th of June 1664, granted the southern part of it to Sir George Carteret and Lord Berkeley of Stratton, which part was called *New Jersey*. Ten years after this the two lords proprietors, with the consent of the duke, divided this country into East Jersey under Sir George Carteret, and West Jersey under Lord Berkeley. The duke of York, notwithstanding this, refused for a short space the government of West Jersey; but by a new deed, in the year 1680, revived and confirmed the former division, by which West Jersey was restored to lord Berkeley. These proprietors afterwards assigned their rights to others; and the inhabitants frequently falling out with the governors they sent over, and the assignees of the original proprietors disagreeing amongst themselves, the latter, by a solemn act, April 17th, 1702, resigned both provinces to the queen, reserving however the property in the soil, &c. Since this period it hath been a royal government, though sometimes the same person hath been governor of New York and the Jerseys. The exports, 1769, amounted to no more than 2531 l. all for the British or foreign West Indies. In 1770, there were entered inwards two ships and 41 sloops; cleared outwards two ships and 47 sloops.

JERUSALEM, a very famous and ancient city, capital of Judea or Palestine, now a province of Turkey in Asia. According to Manetho, an Egyptian historian, it was founded by the shepherds who invaded Egypt in an unknown period of antiquity†. According to Josephus, it was the capital of Melchisedek's kingdom, called *Salem* in the book of Genesis: and the Arabians assert, that it was built in honour of Melchisedek by 12 neighbouring kings; which when they

had done, he called it *Jerusalem*. We know nothing of it with certainty, however, till the time of king David, who took it from the Jebusites, and made it the capital of his kingdom, which it ever after continued to be. It was first taken in the days of Jehoash, by Hazael the king of Syria, who slew all the nobility, but did not destroy their city. It was afterwards taken by Nebuchadnezzar king of Babylon, who destroyed it, and carried away the inhabitants. Seventy years after, permission was granted by Cyrus king of Persia to the Jews to rebuild their city, which was done; and it continued the capital of Judæa, (though frequently suffering much from the Grecian monarchs of Syria and Egypt,) till the time of Vespasian emperor of Rome, by whose son Titus it was totally destroyed*. It was, however, rebuilt by Adrian; and seemed likely to have recovered its former grandeur, being surrounded with walls, and adorned with several noble buildings; the Christians also being permitted to settle in it. But this was a short-lived change; so that when the empress Helena, mother of Constantine the Great, came to visit this city, she found it in the most forlorn and ruinous situation. Having formed a design of restoring it to its ancient lustre, she caused, with a great deal of cost and labour, all the rubbish that had been thrown upon those places where our Saviour had suffered, been buried, &c. to be removed. In doing this, they found the cross on which he died, as well as those of the two malefactors who suffered with him; and, as the writers of those times relate, discovered by a miracle that which had borne the Saviour of mankind. She then caused a magnificent church to be built, which inclosed as many of the scenes of our Saviour's sufferings as could conveniently be done, and adorned the city with several other buildings. The emperor Julian is said to have formed a design of rebuilding the temple of Jerusalem, and of restoring the Jewish worship. This scheme was contrived on purpose to give the lie to our Saviour's prophecy concerning the temple and city of Jerusalem, namely, that the first should be totally destroyed, without one stone being left upon another; and that Jerusalem should be trodden down of the Gentiles till the times of the Gentiles were fulfilled. In this attempt, however, according to the accounts of the Christian writers of that age, the emperor was frustrated by an earthquake and fiery eruption from the earth, which totally destroyed the work, consumed the materials which had been collected, and killed a great number of the workmen.

This event hath been the subject of much dispute. Mr Warburton, who hath published a treatise expressly on the truth of this fact, hath collected the following testimonies in favour of it. The first is that of Ammianus Marcellinus, who tells us, "Julian (having been already thrice consul) taking Sallust, prefect of the several Gauls, for his colleague, entered a fourth time on this high magistracy; and although his sensibility of the many and great events which this year was likely to produce made him very anxious for the future, yet he both pushed on the various and complicated preparatives for this expedition with the utmost application, and, having an eye in every quarter, and being desirous to eternize his reign by the greatness of his achievements, he projected to rebuild

Jerusalem.

* See *Jeru.*† See *Egypt*,
no 2.

Jerusalem. rebuild at an immense expence the proud and magnificent temple of Jerusalem; which, (after many combats, attended with much bloodshed on both sides, during the siege by Vespasian) was with great difficulty taken and destroyed by Titus. He committed the conduct of this affair to Alympius of Antioch, who had formerly been lieutenant in Britain. When therefore this Alympius had set himself to the vigorous execution of his charge, in which he had all the assistance that the governor of the province could afford him, horrible balls of fire breaking out near the foundations, with frequent and reiterated attacks, rendered the place from time to time inaccessible to the scorched and blasted workmen; and the victorious element continuing, in this manner, obstinately and resolutely bent, as it were, to drive them to a distance, Alympius thought best to give over the enterprise."

The next testimony is that of Gregory Nazianzen. Speaking of the emperor Julian, he says, "After having run through a course of every other tyrannical experiment against the faith, and upon trial despising all of them as trifling and contemptible, he at last brought down the whole body of the Jews upon us; whom, for their ancient turn to seditious novelties, and an inveterate hatred of the Christian name, he chose as the fittest instrument for his machinations. These, under a show of great good-will, which hid his secret purpose, he endeavoured to convince from their sacred books and traditions, which he took upon him to interpret, that now was come the time foretold, when they should return to their own land, rebuild their temple, and restore the law to its ancient force and splendor. When these things had been thoroughly insinuated, and heartily entertained, (for deceit finds easy admittance when it flatters our passions), the Jews set upon the work of rebuilding with great attention, and pushed on the project with the utmost labour and application. But when, now driven from their work by a violent whirlwind and a sudden earthquake, they fled together for refuge to a certain neighbouring church, (some to deprecate the impending mischief; others, as is natural in such cases, to catch at any help that presents itself; and others again, enveloped in the crowd, were carried along with the body of those who fled), there are who say, the church refused them entrance; and that when they came to the doors which were wide open but a moment before, they found them on a sudden closed by a secret and invisible hand; a hand accustomed to work these wonders by the terror and confusion of the impious, and for the security and comfort of godly men. This, however, is now invariably affirmed and believed by all, that as they strove to force their way in by violence, the fire which burst from the foundations of the temple, met and stopped them. One part it burnt and destroyed, and another it desperately maimed, leaving them a living monument of God's commination and wrath against sinners. Thus the affair passed; and, let no man continue incredulous concerning this or the other miraculous works of God. But still the thing most wonderful and illustrious was, a light which appeared in the heavens, of a cross within a circle. That name and figure which impious men before esteemed so dishonourable upon

earth, was now raised on high, and equally objected to the common view of all men; advanced by God himself as the trophy of his victory over unbelievers; of all trophies the most exalted and sublime. Nay further, they who were present, and partakers of the miracle we are now about to speak of, shew to this very day the sign or figure of the cross which was then marked or impressed upon their garments. For at that time, as these men, (whether such as were of us, or strangers) were shewing these marks, or attending to others who shewed them, each presently observed the wonder, either on himself or his neighbour; having a radiant mark on his body or on his garment, in which there is something that, in art and elegance, exceeded all painting or embroidery."

Notwithstanding these testimonies, however, this fact hath been strenuously contested by others; and indeed it must be owned that the testimonies above mentioned are by no means unexceptionable. In the last particularly, the propensity to the marvellous is so exceedingly great, that every one must at first sight be struck with it. It is true indeed, the most miraculous part of it, as it seemed to be to Gregory, namely, the appearance of crosses upon the garments and bodies of some of the people who were struck, may be explained upon a natural principle; since we are assured that lightning will sometimes produce effects of this kind*: but even this is no decisive proof of the authenticity of the relation; though it cannot by any means discredit it, as some think. On the whole, however, it is not a matter of any consequence whether this event happened with the circumstances abovementioned or not. If Julian did make any attempt to rebuild the temple, it is certain that something obstructed the attempt, because the temple was never actually rebuilt. If he made no such attempt, the prophecy of our Saviour still holds good; and it surely cannot be thought to detract from the merit of a prophecy, that no body ever attempted to elude it, or prove it to be a falsehood.

Jerusalem continued in the hands of the eastern emperors till the reign of the Caliph Omar, who reduced it under his subjection. The Saracens continued in possession of it till the year 1099, when it was taken by the crusaders. They founded a new kingdom, of which Jerusalem was the capital, which lasted 88 years under nine kings. At last this kingdom was utterly ruined by Saladin; and though the Christians once more got possession of the city, they were again obliged to relinquish it. In 1217, the Saracens were expelled by the Turks, who have ever since continued in possession of it.

The city of Jerusalem, in its most flourishing state, was divided into four parts, each inclosed with its own walls; viz. 1. The old city of Jebus, which stood on mount Zion, where the prophets dwelt, and where David built a magnificent castle and palace, which became the residence both of himself and successors; on which account it was emphatically called, *the city of David*. 2. The lower city, called also *the daughter of Zion*, being built after it; on which stood the two magnificent palaces which Solomon built for himself and his queen; that of the Maccabean princes; and the stately amphitheatre built by Herod, capable of containing 80,000 spectators; the strong citadel, built

Jerusalem.

* See Lightning.

Jerusalem. built by Antiochus, to command and overtop the temple, but afterwards razed by Simon the Maccabæe, who recovered the city from the Syrians; and lastly, a second citadel, built by Herod, upon a high and craggy rock, and called by him *Antonia*. 3. The new city, mostly inhabited by tradesmen, artificers, and merchants; and, 4. Mount Moriah, on which was built the so famed temple of Solomon, described in the sixth and seventh chapters of the second book of Kings; and, since then, that rebuilt by the Jews on their return from Babylon, and afterwards built almost anew and greatly adorned and enriched by Herod.

Some idea of the magnificence of this temple may be had from the following considerations. 1. That there were no less than 163,300 men employed in the work. 2. That notwithstanding that prodigious number of hands, it took up seven whole years in building. 3. That the height of this building was 120 cubits, or 82 yards, rather more than less; and the courts round it about half as high. 4. That the front, on the east side, was sustained by ramparts of square stone, of vast bulk, and built up from the valley below, which last was 300 cubits high, and being added to that of the edifice amounted to 420 cubits; to which, if we add, 5. The height of the principal tower above all the rest, viz. 60; will bring it to 480 cubits, which, reckoning at two feet to a cubit will amount to 960 feet; but, according to the length of that measure, as others reckon it, viz. at two feet and an half, it will amount to 1200 feet; a prodigious height this from the ground, and such as might well make Josephus say, that the very design of it was sufficient to have turned the brain of any but Solomon. 6. These ramparts, which were raised in this manner, to fill up the prodigious chasm made by the deep valley below, and to make the area of a sufficient breadth and length for the edifice, were 1000 cubits in length at the bottom, and 800 at the top, and the breadth of them 100 more. 7. The huge buttresses which supported the ramparts were of the same height, square at the top, and 50 cubits broad, and jutted out 150 cubits at the bottom. 8. The stones, of which they were built, were, according to Josephus, 40 cubits long, 12 thick, and 8 high, all of marble, and so exquisitely joined, that they seemed one continued piece, or rather polished rock. 9. According to the same Jewish historian, there were 1453 columns of Parian marble, and twice that number of pilasters; and of such thickness, that three men could hardly embrace them, and their height and capitals proportionable, and of the Corinthian order. But it is likely Josephus hath given us these two last articles from the temple of Herod, there being nothing like them mentioned by the sacred historians, but a great deal about the prodigious cedars of Lebanon used in that noble edifice, the excellent workmanship of them adapted to their several ends and designs, together with their gildings and other curious ornaments. The only thing more we shall venture to add is, what is affirmed in Scripture, that all the materials of this stupendous fabric were finished and adapted to their several ends before they were brought to Jerusalem, that is, the stones in their quarries, and the cedars in Lebanon; so that their was no noise of ax, hammer, or any tool, heard in the rearing of it.

At present Jerusalem is called by the Turks *Cud-sembaric*, and *Coudsheriff*; and is reduced to a poor thinly-inhabited town, about three miles in circumference, situated on a rocky mountain, surrounded on all sides, except the north, with steep ascents and deep valleys; and these again environed with other hills, at some distance from them. In the neighbourhood of the city there grow some corn, vines, olives, &c. The stately church erected by the empress Helena, on mount Cavalry, is still standing. It is called the *church of the sepulchre*; and is kept in good repair by the generous offerings of a constant concourse of pilgrims, who annually resort to it, as well as by the contributions of several Christian princes. The walls of this church are of stone, and the roof of cedar; the east end incloses Mount Calvary, and the west the holy sepulchre: the former is covered with a noble cupola, open at top, and supported by 16 massive columns. Over the high altar, at the east end, is another stately dome. The nave of the church constitutes the choir; and in the inside-aisles are shewn the places where the most remarkable circumstances of our Saviour's passion was transacted, together with the tombs of Godfrey and Baldwin, the two first Christian kings of Jerusalem. In the chapel of the crucifixion, is shewn the very hole in the rock in which the cross is said to have been fixed. The altar in this chapel hath three crosses on it; and is richly adorned, particularly with four lamps of immense value that hang before it, and are kept constantly burning. At the west end is that of the sepulchre, which is hewn in that form out of the solid rock, and hath a small dome supported by pillars of porphyry. The cloister round the sepulchre is divided into sundry chapels, appropriated to the several sorts of Christians who reside there; as Greeks, Armenians, Maronites, Jacobites, Copts, Abyssines, Georgians, &c. and on the north-west side of it are the apartments of the Latins, who have the care of the church, and are forced to reside constantly in it; the Turks keeping the keys of it, and not suffering any of them to go out, but obliging them to receive their provisions in at a wicket. At Easter there are some grand ceremonies performed in the church, representing our Lord's passion, crucifixion, death, and resurrection, at which a vast concourse of pilgrims commonly assist. For a particular account of them, we refer the reader to doctors Shaw and Pococke.

On Mount Moriah, on the south-east part of the city, is an edifice called *Solomon's Temple*, standing on or near the same spot as the ancient; but when or by whom erected is uncertain. In the midst of it is a Turkish mosque, where the Jewish sanctum sanctorum is supposed to have stood. The building, which Dr Pococke thinks must have been formerly a Christian church, is held in the utmost veneration by the Turks.

The city is now under the government of a sangiac, who resides in a house said to have been that of Pontius Pilate, over-against the castle of Antonia built by Herod the Great. Many of the churches erected in memory of some remarkable gospel-transaction, have been since converted into mosques; into some of which money will procure admittance, but not into others. Both the friars and other Christians are kept so poor by the tyranny of the government, that the chief sup-

port and trade of the place consists in providing strangers with food and other accommodations, and selling them beads, relics, and other trinkets, for which they are obliged to pay considerable sums to the sangiac, as well as to his officers; and those are seldom so well contented with their usual duties, but they frequently extort some fresh ones, especially from the Franciscans, whose convent is the common receptacle for all pilgrims, and for which they have considerable allowances from the pope, and other crowned heads, besides the presents which strangers generally make them at their departure. The most remarkable antiquities in the neighbourhood of Jerusalem are, 1. The pools of Bethesda and Gihon; the former 120 paces long, 40 broad, and at least eight deep, but now without water; and the old archives, which it still discovers at the well end, are quite dammed up: the other, which is about a quarter of a mile without Bethlehem-gate, is a very lately relic, 106 paces long, and 60 broad, lined with a wall and plaster, and still well stored with water. 2. The tomb of the Virgin Mary, in the valley of Jehoshaphat, into which one descends by a magnificent flight of 47 steps. On the right hand as one goes down, is also the sepulchre of St Ann the mother, and on the left that of Joseph the husband, of that virgin-mother: some add likewise that of Jehoiakim her father. In all these are erected altars for priests of all sorts to say mass, and the whole is cut into the solid rock. 3. The tomb of king Jehoshaphat, cut likewise into the rock, and divided into several apartments; in one of which is his tomb, which is adorned with a stately portico and entablature over it. 4. That commonly called *Abfalom's pillar or place*, as being generally supposed to be that which he is said to have erected in his life-time to perpetuate his memory, as he had no male-issuë. The place, however, both within and without, hath more the resemblance of a sepulchre than any thing else: though we do not read that he was buried there, neither do the people here affirm that he was. There is a great heap of stones about it, which is continually increasing; the superstitious Jews and Turks always throwing some as they pass, in token of their abhorrence of Abfalom's unnatural rebellion against so good and holy a parent. The structure itself is about 20 cubits square, and 60 high, rising in a lofty square, adorned below with four columns of the Ionic order, with their capitals, entablatures, &c. to each front. From the height of 20 to 40 cubits, it is somewhat less, and quite plain, excepting a small fillet at the upper end; and from 40 to the top it changes into a round, which grows gradually into a point, the whole cut out of the solid rock. There is a room within, considerably higher than the level of the ground without, on the sides of which are niches, probably to receive coffins. 5. A little eastward of this is that called the *tomb of Zechariah*, the son of Barachiah, whom the Jews slew between the temple and the altar, as is commonly supposed. This fabric is all cut out of the natural rock, 18 feet high, and as many square; and adorned with Ionic columns on each front, cut out likewise of the same rock, and supporting a cornice. The whole ends in a pointed top, like a diamond. But the most curious, grand, and elaborate pieces, in this kind, are the grotts without the walls of Jerusalem, styled the *royal sepulchres*;

but of what kings is not agreed on. They consist of a great number of apartments, some of them spacious, all cut out of the solid marble rock; and may justly be pronounced a royal work, and one of the most noble, surprising, and magnificent. For a particular account of them we must refer the reader, for want of room, to Pococke's Travels. In the neighbourhood of Jerusalem is a spot of ground, about 30 yards long and 15 broad, now the burying-place of the Armenians, which is shewn as the *Aceldama*, or *Field of Blood*, formerly the *Potter's Field*, and since styled *Campo Sancto*, or the *Holy Field*, purchased with the price of Judas's treason, for the burial of strangers. It is walled round, to prevent the Turks abusing the bones of Christians; and one half of it is taken up by a building in the nature of a charnel-house. Besides the above, a great many other antiquities in the city and its environs are shewn to strangers; there being scarce any place or transaction mentioned either in the Old or New Testament, but they shew the very spot of ground where the one stood, and the other was done; not only here, but all over Judæa.

JESI, an ancient town of Italy, in the territory of the church, and in the marca or march of Ancona, with a bishop's see. It is seated on a mountain, near a river of the same name, in E. Long. 12. 20. N. Lat. 43. 50.

JESSO, *Jenso*, or *Tadsjo*, a large island of Asia to the north of Niphon, and said to be governed by a prince tributary to the empire of Japan; but is very little known to the Europeans, so that nothing can be said with certainty concerning it.

JESSES, ribbons that hang down from garlands or crowns in falconry; also short straps of leather fastened to the hawk's legs, and so to the vervels.

JESUITS, or the *Society of Jesus*; a famous religious order of the Romish church, founded by Ignatius Loyola. See IGNATIUS.—The plan which this fanatic formed of its constitution and laws was suggested, as he gave out, and as his followers still teach, by the immediate inspiration of heaven. But notwithstanding this high pretension, his design met at first with violent opposition. The pope, to whom Loyola had applied for the sanction of his authority to confirm the institution, referred his petition to a committee of cardinals. They represented the establishment to be unnecessary as well as dangerous, and Paul refused to grant his approbation of it. At last, Loyola removed all his scruples by an offer which it was impossible for any pope to resist. He proposed, that besides the three vows of poverty, of chastity, and of monastic obedience, which are common to all the orders of regulars, the members of his society should take a fourth vow of obedience to the pope, binding themselves to go whither-soever he should command for the service of religion, and without requiring any thing from the holy see for their support. At a time when the papal authority had received such a shock by the revolt of so many nations from the Romish church; at a time when every part of the popish system was attacked with so much violence and success, the acquisition of a body of men, thus peculiarly devoted to the see of Rome, and whom it might set in opposition to all its enemies, was an object of the highest consequence. Paul instantly perceiving this, confirmed the institution of the Jesuits.

Foundation
of the order.

Confirmed
by the
pope, and
from what
motives.

Jesuits.

Suits by his bull, granted the most ample privileges to the members of the society, and appointed Loyola to be the first general of the order. The event hath fully justified Paul's discernment, in expecting such beneficial consequences to the see of Rome from this institution. In less than half a century, the society obtained establishments in every country that adhered to the Roman-catholic church: its power and wealth increased amazingly; the number of its members became great; their character as well as accomplishments were still greater; and the Jesuits were celebrated by the friends and dreaded by the enemies of the Romish faith as the most able and enterprising order in the church.

The constitution and laws of the society were perfected by Laynez and Aquaviva, the two generals who succeeded Loyola, men far superior to their master in abilities and in the science of government. They framed that system of profound and artful policy which distinguishes the order. The large infusion of fanaticism mingled with its regulation should be imputed to Loyola its founder. Many circumstances concurred in giving a peculiarity of character to the order of Jesuits, and in forming the members of it not only to take greater part in the affairs of the world than any other body of monks, but to acquire superior influence in the conduct of them.

³
The object
of the or-
der singu-
lar.

The primary object of almost all the monastic orders is to separate men from the world, and from any concern in its affairs. In the solitude and silence of the cloister, the monk is called to work out his own salvation by extraordinary acts of mortification and piety. He is dead to the world, and ought not to mingle in its transactions. He can be of no benefit to mankind but by his example and by his prayers. On the contrary, the Jesuits are taught to consider themselves as formed for action. They are chosen soldiers, bound to exert themselves continually in the service of God, and of the pope his vicar on earth. Whatever tends to instruct the ignorant, whatever can be of use to reclaim or to oppose the enemies of the holy see, is their proper object. That they may have full leisure for this active service, they are totally exempted from those functions the performance of which is the chief business of other monks. They appear in no processions; they practise no rigorous austerities; they do not consume one half of their time in the repetition of tedious offices: but they are required to attend to all the transactions of the world, on account of the influence which these may have upon religion; they are directed to study the dispositions of persons in high rank, and to cultivate their friendship; and by the very constitution as well as genius of the order, a spirit of action and intrigue is infused into all its members.

⁴
Peculiar-
ities in its
policy.

As the object of the society of Jesuits differed from that of the other monastic orders, the diversity was no less in the form of its government. The other orders are to be considered as voluntary associations, in which whatever affects the whole body is regulated by the common suffrage of all its members. The executive power is vested in the persons placed at the head of each convent or of the whole society; the legislative authority resides in the community. Affairs of moment, relating to particular convents, are determi-

ned in conventual chapters; such as respect the whole order are considered in general congregations. But Loyola, full of the ideas of implicit obedience, which he had derived from his military profession, appointed that the government of his order should be purely monarchical. A general, chosen for life by deputies from the several provinces, possessed power that was supreme and independent, extending to every person and to every case. He, by his sole authority, nominated provincials, rectors, and every other officer employed in the government of the society, and could remove them at pleasure. In him was vested the sovereign administration of the revenues and funds of the order. Every member belonging to it was at his disposal; and by his uncontrollable mandate he could impose on them any talk, or employ them in what service he pleased. To his commands they were required to yield not only outward obedience, but to resign up to him the inclinations of their own wills and the sentiments of their own understandings. They were to listen to his injunctions as if they had been uttered by Christ himself. Under his direction they were to be mere passive instruments, like clay in the hands of the potter, on like dead carcasses incapable of resistance. Such a singular form of policy could not fail to impress its character on all the members of the order, and to give a peculiar force to all its operations. There is not, in the annals of mankind, any example of such a perfect despotism, exercised not over monks shut up in the cells of a convent, but over men dispersed among all the nations of the earth.

Jesuits.

⁵
Power of
the general

As the constitutions of the order vest in the general such absolute dominion over all its members, they carefully provide for his being perfectly informed with respect to the character and abilities of his subjects. Every novice who offers himself as a candidate for entering into the order, is obliged to manifest his conscience to the superior, or a person appointed by him; and is required to confess not only his sins and defects, but to discover the inclinations, the passions, and the bent of his soul. This manifestation must be renewed every six months. The society, not satisfied with penetrating in this manner into the innermost recesses of the heart, directs each member to observe the words and actions of the novices: they are constituted spies upon their conduct, and are bound to disclose every thing of importance concerning them to the superior. In order that this scrutiny into their character may be as complete as possible, a long novitiate must expire, during which they pass through the several gradations of ranks in the society; and they must have attained the full age of thirty-three years, before they can be admitted to take the final vows, by which they become professed members. By these various methods, the superiors, under whose immediate inspection the novices are placed, acquire a thorough knowledge of their dispositions and talents. In order that the general, who is the soul that animates and moves the whole society, may have under his eye every thing necessary to inform or direct him, the provincials and heads of the several houses are obliged to transmit to him regular and frequent reports concerning the members under their inspection. In these they descend into minute details with respect to the character of each person, his abilities natural or acquired, his temper, his experience

Jesuits. rience in affairs, and the particular department for which he is best fitted. These reports, when digested and arranged, are entered into registers kept of purpose, that the general may, at one comprehensive view, survey the state of the society in every corner of the earth : observe the qualifications and talents of its members ; and thus choose, with perfect information, the instruments which his absolute power can employ in any service for which he thinks meet to define them.

6 As it was the professed intention of the order of Jesuits to labour with unwearied zeal in promoting the salvation of men, this engaged them of course in many active functions. From their first institution, they considered the education of youth as their peculiar province ; they aimed at being spiritual guides and confessors ; they preached frequently in order to instruct the people ; they set out as missionaries to convert unbelieving nations. The novelty of the institution, as well as the singularity of its objects, procured the order many admirers and patrons. The governors of the society had the address to avail themselves of every circumstance in its favour, and in a short time the number as well as influence of its members increased wonderfully. Before the expiration of the sixteenth century, the Jesuits had obtained the chief direction of the education of youth in every catholic country in Europe. They had become the confessors of almost all its monarchs ; a function of no small importance in any reign, but, under a weak prince, superior even to that of minister. They were the spiritual guides of almost every person eminent for rank or power. They possessed the highest degree of confidence and interest with the papal court, as the most zealous and able champions for its authority. The advantages which an active and enterprising body of men might derive from all these circumstances are obvious. They formed the minds of men in their youth. They retained an ascendancy over them in their advanced years. They possessed, at different periods, the direction of the most considerable courts in Europe. They mingled in all affairs. They took part in every intrigue and revolution. The general, by means of the extensive intelligence which he received, could regulate the operations of the order with the most perfect discernment ; and, by means of his absolute power, could carry them on with the utmost vigour and effect.

7 Together with the power of the order, its wealth continued to increase. Various expedients were devised for eluding the obligation of the vow of poverty. The order acquired ample possessions in every catholic country ; and by the number as well as magnificence of its public buildings, together with the value of its property, moveable or real, it vied with the most opulent of the monastic fraternities. Besides the sources of wealth common to all the regular clergy, the Jesuits possessed one which was peculiar to themselves. Under pretext of promoting the success of their missions, and of facilitating the support of their missionaries, they obtained a special licence from the court of Rome to trade with the nations which they laboured to convert. In consequence of this, they engaged in an extensive and lucrative commerce both in the East and West Indies. They opened warehouses in different parts of Europe, in which they vended their com-

modities. Not satisfied with trade alone, they imitated the example of other commercial societies, and aimed at obtaining settlements. They acquired possession accordingly of a large and fertile province in the southern continent of America, and reigned as sovereigns over some hundred thousand subjects.

Unhappily for mankind, the vast influence which the order of Jesuits acquired by all these different means, has been often exerted with the most pernicious effect. Such was the tendency of that discipline observed by the society in forming its members, and such the fundamental maxims in its constitution, that every Jesuit was taught to regard the interest of the order as the capital object to which every consideration was to be sacrificed. This spirit of attachment to their order, the most ardent perhaps that ever influenced any body of men, is the characteristic principle of the Jesuits, and serves as a key to the genius of their policy as well as the peculiarities in their sentiments and conduct.

As it was for the honour and advantage of the society that its members should possess an ascendant over persons in high rank or of great power ; the desire of acquiring and preserving such a direction of their conduct with greater facility, has led the Jesuits to propagate a system of relaxed and pliant morality, which accommodates itself to the passions of men, which justifies their vices, which tolerates their imperfections, which authorises almost every action that the most audacious or crafty politician would wish to perpetrate.

As the prosperity of the order was intimately connected with the preservation of the papal authority, the Jesuits, influenced by the same principle of attachment to the interests of their society, have been the most zealous patrons of those doctrines which tend to exalt ecclesiastical power on the ruins of civil government. They have attributed to the court of Rome a jurisdiction as extensive and absolute as was claimed by the most presumptuous pontiffs in the dark ages. They have contended for the entire independence of ecclesiastics on the civil magistrates. They have published such tenets concerning the duty of opposing princes who were enemies of the catholic faith as countenanced the most atrocious crimes, and tended to dissolve all the ties which connect subjects with their rulers.

As the order derived both reputation and authority from the zeal with which it stood forth in defence of the Romish church against the attacks of the reformers, its members, proud of this distinction, have considered it as their peculiar function to combat the opinions and to check the progress of the Protestants. They have made use of every art, and have employed every weapon against them. They have set themselves in opposition to every gentle or tolerating measure in their favour. They have incessantly stirred up against them all the rage of ecclesiastical and civil persecution.

Monks of other denominations have indeed ventured to teach the same pernicious doctrines, and have held opinions equally inconsistent with the order and happiness of civil society. But they, from reasons which are obvious, have either delivered such opinions with greater reserve, or have propagated them with less success. Whoever recollects the events which have

Jesuits.

9
Pernicious
effects of
these on
civil so-
ciety.]

Jesuits.

happened in Europe during two centuries, will find that the Jesuits may justly be considered as responsible for most of the pernicious effects arising from that corrupt and dangerous casuistry, from those extravagant tenets concerning ecclesiastical power, and from that intolerant spirit, which have been the disgrace of the church of Rome throughout that period, and which have brought so many calamities upon civil society.

9
Some advantages resulting from the institution of this order.

But, amidst many bad consequences flowing from the institution of this order, mankind, it must be acknowledged, have derived from it some considerable advantages. As the Jesuits made the education of youth one of their capital objects, and as their first attempts to establish colleges for the reception of students were violently opposed by the universities in different countries, it became necessary for them, as the most effectual method of acquiring the public favour, to surpass their rivals in science and industry. This prompted them to cultivate the study of ancient literature with extraordinary ardour. This put them upon various methods for facilitating the instruction of youth; and, by the improvements which they made in it, they have contributed so much towards the progress of polite learning, that on this account they have merited well of society. Nor has the order of Jesuits been successful only in teaching the elements of literature; it has produced likewise eminent masters in many branches of science, and can alone boast of a greater number of ingenious authors than all the other religious fraternities taken together.

10
Settlement in Paraguay

But it is in the new world that the Jesuits have exhibited the most wonderful display of their abilities, and have contributed most effectually to the benefit of the human species. The conquerors of that unfortunate quarter of the globe had nothing in view but to plunder, to enslave, and to exterminate its inhabitants. The Jesuits alone have made humanity the object of their settling there. About the beginning of the last century, they obtained admission into the fertile province of Paraguay, which stretches across the southern continent of America, from the bottom of the mountains of Potosi to the confines of the Spanish and Portuguese settlements on the banks of the river de la Plata. They found the inhabitants in a state little different from that which takes place among men when they first begin to unite together; strangers to the arts, subsisting precariously by hunting or fishing, and hardly acquainted with the first principles of subordination and government. The Jesuits set themselves to instruct and to civilize these savages. They taught them to cultivate the ground, to rear tame animals, and to build houses. They brought them to live together in villages. They trained them to arts and manufactures. They made them taste the sweets of society, and accustomed them to the blessings of security and order. These people became the subjects of their benefactors, who have governed them with a tender attention, resembling that with which a father directs his children. Respected and beloved almost to adoration, a few Jesuits presided over some hundred thousand Indians. They maintained a perfect equality among all the members of the community. Each of them was obliged to labour, not for himself alone, but for the public. The produce of their fields, together with the fruits of their industry of every species, were deposited in common storehouses, from which

each individual received every thing necessary for the supply of his wants. By this institution, almost all the passions which disturb the peace of society, and render the members of it unhappy, were extinguished. A few magistrates, chosen by the Indians themselves, watched over the public tranquillity, and secured obedience to the laws. The sanguinary punishments frequent under other governments were unknown. An admonition from a Jesuit, a slight mark of infamy, or, on some singular occasion, a few lashes with a whip, were sufficient to maintain good order among these innocent and happy people.

But, even in this meritorious effort of the Jesuits for the good of mankind, the genius and spirit of their order have mingled and are discernible. They plainly aimed at establishing in Paraguay an independent empire, subject to the society alone, and which, by the superior excellence of its constitution and police, could scarcely have failed to extend its dominion over all the southern continent of America. With this view, in order to prevent the Spaniards or Portuguese in the adjacent settlements from acquiring any dangerous influence over the people within the limits of the province subject to the society, the Jesuits endeavoured to inspire the Indians with hatred and contempt of these nations. They cut off all intercourse between their subjects and the Spanish or Portuguese settlements. They prohibited any private trader of either nation from entering their territories. When they were obliged to admit any person in a public character from the neighbouring governments, they did not permit him to have any conversation with their subjects; and no Indian was allowed even to enter the house where these strangers resided, unless in the presence of a Jesuit. In order to render any communication between them as difficult as possible, they industriously avoided giving the Indians any knowledge of the Spanish or of any other European language; but encouraged the different tribes which they had civilized to acquire a certain dialect of the Indian tongue, and laboured to make that the universal language throughout their dominions. As all these precautions, without military force, would have been insufficient to have rendered their empire secure and permanent, they instructed their subjects in the European arts of war. They formed them into bodies of cavalry and infantry, completely armed and regularly disciplined. They provided a great train of artillery, as well as magazines stored with all the implements of war. Thus they established an army so numerous and well-appointed, as to be formidable in a country where a few sickly and ill-disciplined battalions composed all the military force kept on foot by the Spaniards or Portuguese.

Such were the laws, the policy, and the genius of this formidable order; of which, however, a perfect knowledge has only been attainable of late. Europe had observed, for two centuries, the ambition and power of the order. But while it felt many fatal effects of these, it could not fully discern the causes to which they were to be imputed. It was unacquainted with many of the singular regulations in the political constitution or government of the Jesuits, which formed the enterprising spirit of intrigue that distinguished its members, and elevated the body itself to such a height of power. It was a fundamental maxim with the

Jesuits.

11
Downfall of the order in Europe

the Jesuits, from their first institution, not to publish the rules of their order. These they kept concealed as an impenetrable mystery. They never communicated them to strangers, nor even to the greater part of their own members. They refused to produce them when required by courts of justice; and, by a strange solicitude in policy, the civil power in different countries authorized or connived at the establishment of an order of men, whose constitution and laws were concealed with a solicitude which alone was a good reason for having excluded them. During the persecutions lately carried on against them in Portugal and France, the Jesuits have been so inconsiderate as to produce the mysterious volumes of their institute. By the aid of these authentic records, the principles of their government may be delineated, and the sources of their power investigated with a degree of certainty and precision which, previous to that event, it was impossible to attain.

The pernicious effects, however, of the spirit and constitution of this order, rendered it early obnoxious to some of the principal powers in Europe, and gradually brought on its downfall. The emperor Charles V. saw it expedient to check its progress in his dominions; it was expelled England, by proclamation 2 James I. in 1604; Venice, in 1606; Portugal, in 1759; France, in 1764; Spain and Sicily, in 1767; and totally suppressed and abolished by the late Pope Clement XIV. in 1773.

JESUS the Son of Sirach, a native of Jerusalem, composed, about 200 B. C. the book of Ecclesiasticus, called by the Greeks *ἡσυχαστικός*, "replenished with virtue;" who also quote it under the title of the *Wisdom of Solomon the Son of Sirach*. His grandson, who was also of the same name, and a native of Jerusalem, translated it from the Hebrew into Greek about 121 B. C. We have this Greek version, but the Hebrew text is lost.

JESUS CHRIST, the Son of God, and Saviour of mankind, descended from heaven, and took upon him the human nature in Judæa, towards the conclusion of the reign of Herod the Great, king of that country. The place of his birth was Bethlehem, a flourishing city of Judah; but the year in which he was born is not precisely ascertained. The most general opinion is, that it happened about the year of Rome 748 or 749, and about 18 months before the death of Herod. Four inspired writers have transmitted to us an account of the life of Jesus Christ. They mention particularly his birth, lineage, family, and parents; but say very little concerning his infancy and earlier youth. Herod being informed that the Messiah, or king of the Jews, so much spoken of by the prophets, was now born, being afraid that his kingdom should now be taken away, contrived how to destroy his supposed rival: but Christ, being carried, while very young, into Egypt, escaped the cruelty of the tyrant; who, being determined to make sure work, made a general massacre of the infants about Bethlehem, from the age of two years and under.

After the death of Herod, our Saviour was brought back to Judæa; but we are totally ignorant of what his employment was during the interval between his return thither, and the time of his entering upon the ministry. We know only, that when he was but

12 years of age, he disputed in the temple with the most learned of the Jewish doctors; whom he surprised with his knowledge, and the answers he gave to their questions. After this, as the scripture tells us, he continued with his parents, and was subject to them, till he entered upon his ministry. It is said, indeed, though upon no sure foundation, that during this period he followed the trade of his father, who was a carpenter. In the 30th year of his age, he began his public ministry; to which the attention of the people was drawn by the preaching of John, a prophet miraculously inspired of God to proclaim the existence of the Saviour, as now descended upon earth, and visible to the eyes of all; and by this prophet Christ himself was baptized in the waters of Jordan, that he might not, in any point, neglect to answer the demands of the Jewish law.

It is not necessary here to enter into a particular detail of the life and actions of Jesus Christ. Every one knows, that his life was one continued scene of the most perfect sanctity, and the purest and most active virtue; not only without spot, but also beyond the reach of suspicion. And it is also well known, that by miracles of the most stupendous kind, and not more stupendous than salutary and beneficent, he displayed to the universe the truth of that religion which he brought with him from above, and demonstrated the reality of his divine commission in the most illustrious manner. For the propagation of his religion through the country of Judæa, our Saviour chose 12 apostles; whom, however, he sent out only once, and after their return kept them constantly about his person. But, besides these, he chose other 70, whom he dispersed throughout the country.

There have been many conjectures concerning the reason why the number of apostles was fixed at 12, and that of the other teachers at 70. The first, however, was, according to our Saviour's own words (Matt. xix. 28.), an allusion to the 12 tribes of Israel, thereby intimating that he was the king of these 12 tribes; and as the number of his other messengers answers evidently to that of the senators who composed the Sanhedrim, there is a high degree of probability in the conjecture of those who think that Christ by this number designed to admonish the Jews, that the authority of their Sanhedrim was now at an end, and that all power with respect to religious matters was vested in him alone. His ministry, however, was confined to the Jews; nor, while he remained upon earth, did he permit his apostles or disciples to extend their labours beyond this favoured nation. At the same time, if we consider the illustrious acts of mercy and benevolence that were performed by Christ, it will be natural to conclude, that his fame must soon have spread abroad in other countries. Indeed this seems probable from a passage in scripture, where we are told that some Greeks applied to the apostle Philip in order to see Jesus. We learn also from authors of no small note, that Abgarus† king of Edessa, being seized with a severe and dangerous illness, wrote to our Lord, imploring his assistance; and that Jesus not only sent him a gracious answer, but also accompanied it with his picture, as a mark of his esteem for that pious prince. These letters are still extant; but by the judicious part of mankind are universally looked upon

† See Abgarus.

Jesús,
Jet.Jet
Jewel.

as spurious; and indeed the late Mr Jones, in his treatise entitled *A new and full method of settling the canonical authority of the New Testament*, hath offered reasons which seem almost unanswerable against the authenticity of the whole transaction.

The preaching of our Saviour, and the numberless miracles he performed, made such an impression on the body of the Jewish nation, that the chief-priests and leading men, jealous of his authority, and provoked at his reproaching them with their wicked lives, formed a conspiracy against him. For a considerable time their designs proved abortive; but at last, Jesus, knowing that he had fulfilled every purpose for which he came into the world, suffered himself to be taken through the treachery of one of his disciples, named *Judas Iscariot*, and was brought before the Sanhedrim. In this assembly he was accused of blasphemy; and being afterwards brought before Pilate the Roman governor, where he was accused of sedition, Pilate was no sooner sat down to judge in this cause, than he received a message from his wife, desiring him to have nothing to do with the affair, having that very day had a frightful dream on account of our Saviour, whom she called *that just man*. The governor, intimidated by this message, and still more by the majesty of our Saviour himself, and the evident falsehood of the accusations brought against him, was determined if possible to save him. But the clamours of an enraged populace, who at last threatened to accuse Pilate himself as a traitor to the Roman emperor, got the better of his love of justice, which indeed on other occasions was not very fervent.

Our Saviour was now condemned by his judge, though contrary to the plainest dictates of reason and justice; was executed on a cross between two thieves, and very soon expired. Having continued three days in a state of death, he rose from the dead, and made himself visible to his disciples as formerly. He conversed with them 40 days after his resurrection, and employed himself during that time in instructing them more fully concerning the nature of his kingdom; and having manifested the certainty of his resurrection to as many witnesses as he thought proper, he was, in the presence of many of his disciples, taken up into heaven, there to remain till the end of the world. See *CHRISTIANITY*.

JET, in natural history, a kind of fossil substance, the characters of which are these.—It is a solid, dry, opaque, inflammable body, found in large detached masses of a fine and regular structure, having a grain like that of wood, splitting more easily in an horizontal than in any other direction; very light, and moderately hard; not fusible, but readily inflammable, and burning a long time with a fine greenish white flame.

Jet is a substance concerning which many erroneous opinions have been entertained, and which hath been very little understood, even in Britain, where the finest in the world is produced; having been usually confounded with a thing greatly inferior to it in value, the common cannel-coal; so that many believe there is no other jet than that substance: they are, however, easily distinguished from each other by the following characters.—Jet is always found in detached masses lodged in other strata; but cannel-coal constitutes

whole strata of itself. Jet has the grain of wood, and splits horizontally with much greater ease than in any other direction; cannel-coal has no particular direction, and splits any way with equal ease. Jet is but moderately hard; cannel-coal not less so than many stones: jet, when set on fire, flames a long time; cannel-coal but a little while.—Jet is found in Italy, Germany, and the East Indies; but nowhere in such plenty as in England. It is very common in Yorkshire and the other northern counties, and is found in many of the clay-pits about London. By the ancients it was used in medicine, and celebrated as an emollient and discutient; but the modern practice takes no notice of it.

JET-d'Eau, a French term, frequently also used with us, for a fountain that casts up water to a considerable height in the air. See *HYDROSTATICS*, n° 22.; and *ICELAND*, n° 7, 8.

JETTY-HEAD, a name usually given, in the royal dock-yards, to that part of a wharf which projects beyond the rest; but more particularly the front of a wharf, whose side forms one of the cheeks of a dry or wet dock.

JEWEL, any precious stone, or ornament beset with them. See *DIAMOND*, *RUBY*, &c.

JEWEL (John), a learned English writer and bishop, was born in 1522, and educated at Oxford. In 1540 he proceeded A. B. became a noted tutor, and was soon after chosen rhetoric lecturer in his college. In February 1544, he commenced A. M. He had early imbibed Protestant principles, and inculcated the same to his pupils; but this was carried on privately till the accession of king Edward VI. in 1546, when he made a public declaration of his faith, and entered into a close friendship with Peter Martyr, who was made professor of divinity at Oxford. In 1550, he took the degree of B. D. and frequently preached before the university with great applause. At the same time he preached and catechised every other Sunday at Sunningwell in Berkshire, of which church he was rector. Upon the accession of queen Mary to the crown in 1553, he was one of the first who felt the rage of the storm then raised against the reformation; for before any law was made, or order given by the queen, he was expelled Corpus Christi college by the fellows, by their own private authority; but he continued in Oxford, till he was called upon to subscribe to some of the Popish doctrines under the severest penalties, which he submitted to. However, this did not procure his safety; for he was obliged to fly, and, after encountering many difficulties, arrived at Frankfurt, in the 2d year of queen Mary's reign, where he made a public recantation of his subscription to the Popish doctrines. Thence he went to Strasbourg, and afterwards to Zurich, where he attended Peter Martyr, in whose house he resided. He returned to England in 1558, after queen Mary's death; and, in 1559, was consecrated bishop of Salisbury. This promotion was given him as a reward for his great merit and learning; and another attestation of these was given him by the university of Oxford, who, in 1565, conferred on him in his absence the degree of D. D. In this character he attended the queen to Oxford the following year, and presided at the divinity-disputations held before her majesty on that occasion. He had

had before greatly distinguished himself by a sermon preached at St Paul's-cross, presently after he was made a bishop, wherein he gave a public challenge to all the Roman-catholics in the world, to produce but one clear and evident testimony out of any father or famous writer, who flourished within 600 years after Christ, for any one of the articles which the Romanists maintain against the church of England; and, two years afterwards, he published his famous apology for this church. In the mean time, he gave a particular attention to his diocese; where he began in his first visitation, and perfected in his last, such a reformation, not only in his cathedral and parochial churches, but in all the churches of his jurisdiction, as procured him and the whole order of bishops due reverence and esteem. For he was a careful overlooker and strict observer, not only of all the flocks, but also of the pastors, in his diocese: and he watched so narrowly upon the proceedings of his chancellor and archdeacons, and of his stewards and receivers, that they had no opportunities of being guilty of oppression, injustice, or extortion, nor of being a burthen to the people, or a scandal to himself. To prevent these and the like abuses, for which the ecclesiastical courts are often too justly censured, he sat often in his consistory-court, and saw that all things were carried rightly there: he also sat often as assitant on the bench of civil justice, being himself a justice of the peace. Amidst these employments, however, the care of his health was too much neglected; to which, indeed, his general course of life was totally unfavourable. He rose at four o'clock in the morning; and, after prayers with his family at five, and in the cathedral about six, he was so fixed to his studies all the morning, that he could not without great violence be drawn from them. After dinner, his doors and ears were open to all suitors; and it was observed of him as of Titus, that he never sent any sad from him. Suitors being thus dismissed, he heard, with great impartiality and patience, such causes debated before him, as either devolved to him as a judge, or were referred to him as an arbitrator; and if he could spare any time from these, he reckoned it as clear gain to his study. About nine at night he called all his servants to an account how they had spent the day, and then went to prayers with them. From the chapel he withdrew again to his study till near midnight, and from thence to his bed; in which when he was laid, the gentleman of his bed-chamber read to him till he fell asleep. This watchful and laborious life, without any recreation at all, except what his necessary refreshment at meals and a very few hours of rest afforded him, wasted his life too fast. He died at Monkton-Farley, in 1571, in the 50th year of his age. He wrote, 1. A view of a seditious bull sent into England by pope Pius V. in 1569. 2. A treatise on the Holy Scriptures. 3. An exposition of St Paul's two epistles to the Thessalonians. 4. A treatise on the sacrament. 5. An apology for the national church. 6. Several sermons, controversial treatises, and other works.

“This excellent prelate (says the rev. Mr Granger) was one of the greatest champions of the reformed religion, as he was to the church of England what Bellarmine was to that of Rome. His admirable Apology was translated from the Latin by Anne, the

second of the four learned daughters of Sir Anthony Coke, and mother of Sir Francis Bacon. It was published, as it came from her pen, in 1564, with the approbation of the queen and the prelates. The same Apology was printed in Greek at Constantinople, under the direction of St Cyril the patriarch. His Defence of his Apology, against Harding and other Popish divines, was in such esteem, that queen Elizabeth, king James I. king Charles I. and four successive archbishops, ordered it to be kept chained in all parish churches for public use.

JEWEL-Blocks, in the sea-language, a name given to two small blocks which are suspended at the extremity of the main and fore-top-mast yards, by means of an eye-bolt driven from without into the middle of the yard-arm, parallel to its axis. The use of these blocks is, to retain the upper-part of the top-mast studding-sails beyond the skirts of the top-sails, so that each of those sails may have its full force of action, which would be diminished by the encroachment of the other over its surface. The *balliards*, by which those studding-sails are hoisted, are accordingly passed through the jewel-blocks; whence, communicating with a block on the top-mast head, they lead downwards to the top or decks, where they may be conveniently hoisted. See **SAIL**.

JEWS, a name derived from the patriarch Judah, and given to the descendants of Abraham by his eldest son Isaac, who for a long time possessed the land of Palestine in Asia, and are now dispersed through all nations in the world.

The history of this people, as it is the most singular, so is it also the most ancient in the world; and the greatest part being before the beginning of profane history, depends entirely on the authenticity of the Old Testament, where it is only to be found.—To repeat here what is said in the sacred writings would both be superfluous and tedious, as those writings are in every persons hands, and may be consulted at pleasure. It seems most proper therefore to commence the history of the Jews from their return to Jerusalem from Babylon, and the rebuilding of their city and temple under Ezra and Nehemiah, when the scripture leaves off any farther accounts, and profane historians begin to take notice of them.

Cyrus the Great, king of Persia, having conquered Babylon and almost all the western parts of Asia, perceiving the desolate and ruinous condition in which the province of Palestine lay, formed a design of restoring the Jews to their native country, and permitting them to rebuild Jerusalem and re-establish their worship. For this purpose he issued out a decree in the first year of his reign, about 536 B. C. by which they were allowed not only to return and rebuild their city, but to carry along with them all the sacred vessels which Nebuchadnezzar had carried off, and engaged to defray the expence of building the temple himself. This offer was gladly embraced by the more zealous Jews of the tribes of Judah, Benjamin, and Levi; but many more, being no doubt less sanguine about their religion, chose to stay where they were.

In 534 B. C. the foundations of the temple were laid, and matters seemed to go on prosperously, when the undertaking was suddenly obstructed by the Samaritans. These came at first expressing an earnest desire

Cyrus publishes a decree for rebuilding Jerusalem.

Jews.

desire to assist in the work, as they worshipped the same God with the Jews; but the latter refused their assistance, as they knew they were not true Israelites, but the descendants of those heathens who had been transplanted into the country of the ten tribes after their captivity by Shalmanezar. This refusal proved the source of all that bitter enmity which afterwards took place between the Jews and Samaritans; and the immediate consequence was, that the latter made all the opposition in their power to the going on of the work. At last, however, all obstacles were surmounted, and the temple finished as related in the books of Ezra and Nehemiah. The last of these chiefs died about 409 B. C. after having restored the Jewish worship to its original purity, and reformed a number of abuses which took place immediately on its commencement.

2
The temple
&c. finished

But though the Jews were now restored to the free exercise of religion, they were neither a free nor a powerful people as they had formerly been. They were few in number, and their country only a province of Syria, subject to the kings of Persia. The Syrian governors conferred the administration of affairs upon the high-priests; and their accepting this office, and thus deviating from the law of Moses, must be considered as one of the chief causes of the misfortunes which immediately befel the people, because it made room for a set of men who aspired at this high office merely through ambition or avarice, without either zeal for religion, or love for their country. It besides made the high-priethood capable of being disposed of at the pleasure of the governors, whereas the Mosaic institution had fixed it unalienably in the family of Aaron.—Of the bad effects of this practice a fatal instance happened in 373 B. C. Bagoses, governor of Syria, having contracted an intimate friendship with Jeshua the brother of Johanan the high-priest, promised to raise him to the pontifical office a few years after his brother had been invested with it. Jeshua came immediately to Jerusalem, and acquainted his brother with it. Their interview happened in the inner court of the temple; and a scuffle ensuing, Jeshua was killed by his brother, and the temple thus polluted in the most scandalous manner. The consequence to the Jews was, that a heavy fine was laid on the temple, which was not taken off till seven years after.

3
Admini-
stration of
affairs con-
ferred on
the high-
priests.

The first public calamity which befel the Jews nation after their restoration from Babylon, happened in the year 351 B. C.; for having some how or other disobliterated Darius Ochus king of Persia, he besieged and took Jericho, and carried off all the inhabitants captives. From this time they continued faithful to the Persians, inasmuch that they had almost drawn upon themselves the displeasure of Alexander the Great. That monarch having resolved upon the siege of Tyre, and being informed that the city was wholly supplied with provisions from Judea, Samaria, and Galilee, sent to Jaddua, then high-priest, to demand of him that supply which he had been accustomed to pay to the Persians. The Jewish pontiff excused himself on account of his oath of fidelity to Darius; which so provoked Alexander, that he had no sooner completed the reduction of Tyre than he marched against Jerusalem. The inhabitants then, being with good rea-

son thrown into the utmost consternation, had recourse to prayers; and Jaddua is said, by a divine revelation to have been commanded to go and meet Alexander. He obeyed accordingly, and set out on his journey, dressed in his pontifical robes, at the head of all his priests in their proper habits, and attended by the rest of the people dressed in white garments. Alexander is said to have been seized with such awful respect on seeing this venerable procession, that he embraced the high-priest, and paid a kind of religious adoration to the name of God engraven on the front of his mitre. His followers being surprised at this unexpected behaviour, the Macedonian monarch informed them, that he paid that respect not to the priest, but to his God, as an acknowledgment for a vision which he had been favoured with at Dia; where he had been promised the conquest of Persia, and encouraged in his expedition by a person of much the same aspect and dressed in the same habit with the pontiff before him. He afterwards accompanied Jaddua into Jerusalem, where he offered sacrifices in the temple. The high-priest shewed him also the prophecies of Daniel, wherein the destruction of the Persian empire by himself is plainly set forth; in consequence of which the king went away highly satisfied, and at his departure asked the high-priest if there was nothing in which he could gratify himself or his people. Jaddua then told him, that, according to the Mosaic law, they neither sowed nor ploughed on the seventh year; therefore would esteem it an high favour if the king would be pleased to remit their tribute in that year. To this request the king readily yielded; and having confirmed them in the enjoyment of all their privileges, particularly that of living under their own laws, he departed.

Whether this story deserves credit or not (for the whole transaction is not without reason called in question by some), it is certain that the Jews were much favoured by Alexander; but with him their good fortune seemed also to expire. The country of Judea being situated between Syria and Egypt, became subject to all the revolutions and wars which the ambitious successors of Alexander waged against each other.

5
Miserable
state of the
Jews after
Alexander's
death.

At first it was given, together with Syria and Phenicia, to Leomedon the Mitylenian one of Alexander's generals; but he being soon after stripped of the other two by Ptolemy, Judea was next summoned to yield to the conqueror. The Jews scrupled to break their oath of fidelity to Leomedon; and were of consequence invaded by Ptolemy at the head of a powerful army. The open country was easily reduced; but the city being strongly fortified both by art and nature, threatened a strong resistance. A superstitious fear of breaking the sabbath, however, prevented the besieged from making any defence on that day; of which Ptolemy being informed, he caused an assault to be made on the sabbath, and easily carried the place. At first he treated them with great severity, and carried 100,000 men of them into captivity; but reflecting soon after on their known fidelity to their conquerors, he restored them to all the privileges they had enjoyed under the Macedonians. Of the captives he put some into garrisons, and others he settled in the countries of Libya and Cyrene. From those who settled in the latter of these countries descended

Jews. fceded the Cyrenean Jews mentioned by the writers of the New Testament.

Five years after Ptolemy had subdued Judea, he was forced to yield it to Antigonus, referring to himself only the cities of Ace, Samaria, Joppa, and Gaza; and carrying off an immense booty, together with a great number of captives, whom he settled at Alexandria and endowed with considerable privileges and immunities.—Antigonus behaved in such a tyrannical manner, that great numbers of his Jewish subjects fled into Egypt, and others put themselves under the protection of Seleucus, who also granted them considerable privileges. Hence this nation came gradually to be spread over Syria, and Asia Minor; while Judea seemed to be in danger of being depopulated, till it was recovered by Ptolemy in 92. The affairs of the Jews then took a more prosperous turn, and continued in a thriving way till the reign of Ptolemy Philopator, when they were grievously oppressed by the incursions of the Samaritans, at the same time that Antiochus Theos, king of Syria, invaded Galilee. Ptolemy, however, marched against Antiochus, and defeated him; after which, having gone to Jerusalem to offer sacrifices, he ventured to profane the temple itself by going into it. He penetrated thro' the two outer courts; but as he was about to enter the sanctuary, he was struck with such dread and terror that he fell down half-dead. A dreadful persecution was then raised against the Jews, who had attempted to hinder him in his impious attempt; but this persecution was stopped by a still more extraordinary accident related under the article ΕΥΡΥ, n° 30. and the Jews again received into favour.

⁶ About the year 204 B. C. the country of Judea was subdued by Antiochus the Great; and on this occasion the loyalty of the Jews to the Egyptians failed them, the whole nation readily submitting to the king of Syria. This attachment pleased the Syrian monarch, that he sent a letter to his general, wherein he acquainted him that he designed to restore Jerusalem to its ancient splendor, and to recall all the Jews that had been driven out of it: that out of his singular respect to the temple of God, he granted them 20,000 pieces of silver, towards the charges of the victims, frankincense, wine, and oil; 1400 measures of fine wheat; and 375 measures of salt, towards their usual oblations: that the temple should be thoroughly repaired at his cost; that they should enjoy the free exercise of their religion; and restore the public service of the temple, and the priests, Levites, singers, &c. to their usual functions: that no stranger, or Jew that was unpurified, should enter farther into the temple than was allowed by their law; and that no flesh of unclean beasts should be brought into Jerusalem, not even their skins: and all these under the penalty of paying 3000 pieces of silver into the treasury of the temple. He further granted an exemption of taxes for three years to all the dispersed Jews that should come within a limited time to settle in the metropolis; and that all who had been sold for slaves within his dominions should be immediately set free.

⁷ This sudden prosperity proved of no long duration. About the year 176, a quarrel happened between Onias at that time high priest, and one Simon, governor of the temple, which was attended with the most

fatal consequences. The causes of this quarrel are unknown. The event, however, was, that Simon finding he could not get the better of Onias, informed Apollonius governor of Cœlosyria and Palestine, that there was at that time in the temple an immense treasure, which at his pleasure might be seized upon for the use of the king of Syria. Of this the governor instantly sent intelligence to the king, who dispatched one Heliodorus to take possession of the supposed treasure. This person, through a miraculous interposition, as the Jews pretend, failed in his attempt of entering the temple; upon which Simon accused the high-priest to the people, as the person who had invited Heliodorus to Jerusalem. This produced a kind of civil war, in which many fell on both sides. At last Onias having complained to the king, Simon was banished; but soon after, Antiochus Epiphanes having ascended the throne of Syria, Jason, the high-priest's brother, taking advantage of the necessities of Antiochus, purchased from him the high-priesthood at the price of 350 talents, and obtained an order that his brother should be sent to Antioch, there to be confined for life.

Jason's next step was to purchase liberty, at the price of 150 talents more, to build a gymnasium at Jerusalem similar to those which were used in the Grecian cities; and to make as many Jews as he pleased free citizens of Antioch. By means of these powers he became very soon able to form a strong party in Judea; for his countrymen were exceedingly fond of the Grecian customs, and the freedom of the city of Antioch was a very valuable privilege. From this time there arose a general apostasy took place; the service of the temple was neglected, and Jason abandoned himself without remorse to all the impieties and absurdities of paganism.

⁸ A general apostasy takes place.

He did not, however, long enjoy his ill-acquired dignity. Having sent his brother Menelaus with the usual tribute to Antiochus, the former took the opportunity of supplanting Jason in the same manner that he had supplanted Onias. Having offered for the high-priesthood 300 talents more than his brother had given, he easily obtained it, and returned with his new commission to Jerusalem. He soon got himself a strong party; but Jason proving too powerful, forced Menelaus and his adherents to retire to Antioch. Here, the better to gain their point, they acquainted Antiochus that they were determined to renounce their old religion, and wholly conform themselves to that of the Greeks: which so pleased the tyrant, that he immediately gave them a force sufficient to drive Jason out of Jerusalem; who thereupon took refuge among the Ammonites.

Menelaus being thus freed from his rival, took care to fulfil his promise to the king with regard to the apostasy, but forgot to pay the money he had promised. At last he was summoned to Antioch; and finding nothing but the payment of the promised sum would do, sent orders to his brother Lyfimachus to convey to him as many of the sacred utensils belonging to the temple as could be spared. As these were all of gold, the apostate sum raised a sufficient sum from them, not only to satisfy the king, but also to bribe the courtiers in his favour. But his brother Onias, who had been all this time confined at Antioch, getting intelligence of the sacrilege, made such bitter complaints, that an insurrection

Jews.

Jews.

urrection was ready to take place among the Jews at Antioch. Menelaus, in order to avoid the impending danger, bribed Andronicus, governor of the city, to murder Onias. This produced the most vehement complaints as soon as Antiochus returned to the capital, (he having been absent for some time in order to quell an insurrection in Cilicia); which at last ended in the death of Andronicus, who was executed by the king's order. By dint of money, however, Menelaus still found means to keep up his credit; but was obliged to draw such large sums from Jerusalem, that the inhabitants at last massacred his brother Lyfimachus, whom he had left governor of the city in his absence. Antiochus soon after took a journey to Tyre; upon which the Jews sent deputies to him, both to justify the death of Lyfimachus, and to accuse Menelaus of being the author of all the troubles which had happened. The apostate, however, was never at a loss while he could procure money. By means of this powerful argument he pleaded his cause so effectually, that the deputies were not only cast, but put to death; and this unjust sentence gave the traitor such a complete victory over all his enemies, that from thenceforth he commenced a downright tyrant. Jerusalem was destitute of protectors; and the sanhedrim, if there were any zealous men left among them, were so much terrified, that they durst not oppose him, though they evidently saw that his design was finally to eradicate the religion and liberties of his country.

In the mean time, Antiochus was taken up with the conquest of Egypt, and a report was some how or other spread that he had been killed at the siege of Alexandria. At this news the Jews imprudently shewed some signs of joy; and Jason thinking this a proper opportunity to regain his lost dignity, appeared before Jerusalem at the head of about 1000 resolute men. The gates were quickly opened to him by some of his friends in the city; upon which Menelaus retired into the citadel, and Jason, minding nothing but his resentment, committed the most horrid butcheries. At last he was obliged to leave both the city and country, on the news that Antiochus was coming with a powerful army against him; for that prince, highly provoked at this rebellion, and especially at the rejoicings the Jews had made on the report of his death, had actually resolved to punish the city in the severest manner. Accordingly, about 170 B. C. having made himself master of the city, he behaved with such cruelty, that within three days they reckoned no fewer than 40,000 killed, and as many sold for slaves. In the midst of this dreadful calamity, the apostate Menelaus found means not only to preserve himself from the general slaughter, but even to regain the good graces of the king, who, having by his means plundered the temple of every thing valuable, returned to Antioch in a kind of triumph. Before he departed, however, he put Judea under the government of one Philip, a barbarous Phrygian; Samaria under that of Andronicus, a person of a similar disposition; and left Menelaus, the most hateful of all the three, in possession of the high-priesthood.

Though the Jews suffered exceedingly under these tyrannical governors, they were still reserved for greater calamities. About 168 B. C. Antiochus having been most severely mortified by the Romans, took it into

his head to wreck his vengeance on the unhappy Jews. For this purpose he dispatched Apollonius at the head of 22,000 men, with orders to plunder all the cities of Judea, to murder all the men, and sell the women and children for slaves. Apollonius accordingly came with his army, and to outward appearance with a peaceable intention; neither was he suspected by the Jews, as he was superintendent of the tribute in Palestine. He kept himself inactive till the next sabbath, when they were all in a profound quiet; and then, on a sudden, commanded his men to arms. Some of them he sent to the temple and synagogues, with orders to cut in pieces all whom they found there; whilst the rest going through the streets of the city massacred all that came in their way; the superstitious Jews not attempting to make the least resistance for fear of breaking the Sabbath. He next ordered the city to be plundered and set on fire, pulled down all their stately buildings, caused the walls to be demolished, and carried away captive about 10,000 of those who had escaped the slaughter. From that time the service of the temple was totally abandoned; that place having been quite polluted, both with the blood of multitudes who had been killed, and in various other ways. The Syrian troops built a large fortress on an eminence in the city of David; fortified it with a strong wall and stately towers, and put a garrison in it to command the temple over-against which it was built, so that the soldiers could easily see and fallily out upon all those who attempted to come into the temple; so many of whom were continually plundered and murdered by them, that the rest, not daring to stay any longer in Jerusalem, fled for refuge to the neighbouring nations.

Antiochus, not yet satiated with the blood of the Jews, resolved either totally to abolish their religion, or destroy their whole race. He therefore issued out a decree that all nations within his dominions should forsake their old religion and gods, and worship those of the king under the most severe penalties. To make his orders more effectual, he sent overseers into every province to see them strictly put in execution; and as he knew the Jews were the only people who would disobey them, special directions were given to have them treated with the utmost severity. Athens, an old and cruel minister, well versed in all the pagan rites, was sent into Judea. He began by dedicating the temple to Jupiter Olympius, and setting up his statue on the altar of burnt-offerings. Another lesser altar was raised before it, on which they offered sacrifices to that false deity. All who refused to come and worship this idol were either massacred, or put to some cruel tortures till they either complied or expired under the hands of the executioners. At the same time, altars, groves, and statues, were raised every where through the country, and the inhabitants compelled to worship them under the same severe penalties; while it was instant death to observe the sabbath, circumcision, or any other institution of Moses.

At last, when vast numbers had been put to cruel deaths, and many more had saved their lives by their apostasy, an eminent priest, named *Mattathias*, began to signalize himself by his bravery and zeal for religion. He had for some time been obliged to retire to Modin his native place, in order to avoid the persecution which raged at Jerusalem. During his recess

27 The temple profaned, and the Jewish religion abolished.

9 Jerusalem taken by Epiphanes.

10 His monstrous cruelty.

22 Restored by Mattathias.

there, Apelles, one of the king's officers, came to oblige the inhabitants to comply with the abovementioned orders. By him Mattathias and his sons were addressed in the most earnest manner, and had the most ample promises made them of the king's favour and protection if they would renounce their religion. But Mattathias answered, that though the whole Jewish nation, and the whole world, were to conform to the king's edict, yet both he and his sons would continue faithful to their God to the last minute of their lives. At the same time perceiving one of his countrymen just going to offer sacrifices to an idol, he fell upon him and instantly killed him, agreeable to the law of Moses in such cases. Upon this his sons, fired with the same zeal, killed the officer and his men; overthrew the altar and idol; and, running about the city, cried out, that those who were zealous for the law of God should follow them; by which means they quickly saw themselves at the head of a numerous troop, with whom they soon after withdrew into some of the deserts of Judea. They were followed by many others, so that in a short time they found themselves in a condition to resist their enemies; and having considered the danger to which they were exposed by their scrupulous observance of the Sabbath, they resolved to defend themselves, in case of an attack, upon that day as well as upon any other.

In the year 167 B. C. Mattathias finding that his followers daily increased in number, began to try his strength by attacking the Syrians and apostate Jews. As many of these as he took he put to death, but forced a much greater number to fly for refuge into foreign countries; and having soon struck his enemies with terror, he marched from city to city, overturned the idolatrous altars, opened the Jewish synagogues, made a diligent search after all the sacred books, and caused fresh copies of them to be written; he also caused the reading of the Scriptures to be resumed, and all the males born since the persecution to be circumcised. In all this he was attended with such success, that he had extended his reformation through a considerable part of Judea within the space of one year; and would probably have completed it, had he not been prevented by death.

Mattathias was succeeded by his son Judas, surnamed *Maccabeus*, the greatest uninspired hero of whom the Jews can boast. His troops amounted to no more than 6000 men; yet with these he quickly made himself master of some of the strongest fortresses of Judea, and became terrible to the Syrians, Samaritans, and apostate Jews. In one year he defeated the Syrians in five pitched battles, and drove them quite out of the country; after which he purified the temple, and restored the true worship, which had been interrupted for three years and a half. Only one obstacle now remained, viz. the Syrian garrison abovementioned, which had been placed over-against the temple, and which Judas could not at present reduce. In order to prevent them from interrupting the worship, however, he fortified the mountain on which the temple stood, with an high wall and strong towers round about, leaving a garrison to defend it; making some additional fortifications at the same time to Bethzura, a fortress at about 20 miles distance.

In the mean time Antiochus being on his return from an unsuccessful expedition into Persia, received

the disagreeable news that the Jews had all to a man revolted, defeated his generals, driven their armies out of Judea, and restored their ancient worship. This threw him into such a fury, that he commanded his charioteer to drive with the utmost speed, threatening utterly to extirpate the Jewish race, without leaving a single person alive. These words were scarce uttered, when he was seized with a violent pain in his bowels, which no remedy could cure or abate. But notwithstanding this violent shock, suffering himself to be hurried away by the transports of his fury, he gave orders for proceeding with the same precipitation in his journey. But while he was thus hastening forward, he fell from his chariot, and was so bruised by the fall, that his attendants were forced to put him into a litter. Not being able to bear even the motion of the litter, he was forced to halt at a town called *Tabe* on the confines of Persia and Babylonia. Here he kept his bed, suffering inexpressible torments, occasioned chiefly by the vermin which bred in his body, and the itech, which made him insupportable even to himself. But the torments of his mind, caused by his reflecting on the former actions of his life, surpassed by many degrees those of his body. Polybius, who in his account of this prince's death agrees with the Jewish historians, tells us, that the uneasiness of his mind grew at last to a constant delirium or state of madness, by reason of several spectres and apparitions of evil geni or spirits, which he imagined were continually reproaching him with the many wicked actions of which he had been guilty. At last, having languished for some time in this miserable condition, he expired, and by his death freed the Jews from the most inveterate enemy they had ever known.

Notwithstanding the death of Antiochus, however, the war was still carried on against the Jews; but through the valour and good conduct of Judas, the Syrians were constantly defeated, and in 163 B. C. a peace was concluded upon terms very advantageous to the Jewish nation. This tranquillity, however, was of no long continuance; the Syrian generals renewed their hostilities, and were attended with the same ill success as before. Judas defeated them in five engagements; but in the sixth was abandoned by all his men except 800, who, together with their chief, were slain in the year 161 B. C.

The news of the death of Judas threw his countrymen into the utmost consternation, and seemed to give new life to all their enemies. He was succeeded, however, by his brother Jonathan; who conducted matters with no less prudence and success than Judas had done, till he was treacherously seized and put to death by Tryphon, a Syrian usurper, who shortly after murdered his own sovereign. The traitor immediately prepared to invade Judea; but found all his projects frustrated by Simon, Jonathan's brother. This pontiff repaired all the fortresses of Judea, and furnished them with fresh garrisons, took Joppa and Gaza, and drove out the Syrian garrison from the fortress of Jerusalem; but was at last treacherously murdered by a son-in-law named Ptolemy, about 135 B. C.

Simon was succeeded by son Hyrcan; who not only shook off the yoke of Syria, but conquered the Samaritans, demolished their capital city, and became master of all Palestine, to which he added the provinces

14
Dreadful
death of
Antiochus
Epiphanes.

13
Exploits of
Judas Mac-
cabeus.

15
Exploits of
Jonathan,
Simon, and
Hyrcan.

of Samaria and Galilee; all which he enjoyed till within a year of his death, without the least disturbance from without, or any interval discord. His reign was no less remarkable on the account of his great wisdom and piety at home, than his conquests abroad. He was the first since the captivity who had assumed the royal title; and he raised the Jewish nation to a greater degree of splendor than it had ever enjoyed since that time. The author of the fourth book of the Maccabees also informs us, that in him three dignities were centered which never met in any other person, namely, the royal dignity, the high-priesthood, and the gift of prophecy. But the instances given of this last are very equivocal and suspicious. The last year of his reign, however, was embittered by a quarrel with the pharisees; and which proceeded such a length as was thought to have shortened his days. Hyrcan had always been a great friend to that sect, and they had hitherto enjoyed the most honourable employments in the state; but at length one of them, named *Eleazar*, took it into his head to question Hyrcan's legitimacy, alleging, that his mother had formerly been a slave, and consequently that he was incapable of enjoying the high-priesthood. This report was credited, or pretended to be so, by the whole sect; which irritated the high-priest to such a degree, that he joined the sadducees, and could never afterwards be reconciled to the pharisees, who therefore raised all the troubles and seditions they could during the short time he lived.

Hyrcan died in 107 B. C. and was succeeded by his eldest son Aristobolus, who conquered Iturea, but proved a most cruel and barbarous tyrant, polluting his hands with the blood even of his mother and one of his brothers, keeping the rest closely confined during his reign, which, however, was but short. He was succeeded in 105 by Alexander Jannæus, the greatest conqueror, next to king David, that ever sat on the Jewish throne. He was hated, however, by the pharisees, and once in danger of being killed in a tumult excited by them; but having caused his guards to fall upon the mutinous mob, they killed 6000 of them, and dispersed the rest. After this, finding it impossible to remain in quiet in his own kingdom, he left Jerusalem, with a design to apply himself wholly to the extending of his conquests; but while he was busied in subduing his foreign enemies, the pharisees raised a rebellion at home. This was quashed in the year 86 B. C. and the rebels were treated in the most inhuman manner. The faction, however, was by this means so thoroughly quelled, that they never dared to lift up their heads as long as he lived; and Alexander having made several conquests in Syria, died about 79 B. C.

The king left two sons, Hyrcanus and Aristobolus; but bequeathed the government to his wife Alexandra as long as she lived: but as he saw her greatly afraid, and not without reason, of the resentment of the pharisees, he desired his queen, just before his death, to send for the principal leaders of that party, and pretend to be entirely devoted to them; in which case, he assured her, that they would support her and her sons after her in the peaceable possession of the government. With this advice the queen complied; but found herself much embarrassed by the turbulent pharisees, who, after several exorbitant demands, would at last be contented with nothing less than the total

extermination of their adversaries the sadducees. As the queen was unable to resist the strength of the pharisaic faction, a most cruel persecution immediately took place against the sadducees, which continued for four years; until at last, upon their earnest petition, they were dispersed among the several garrisons of the kingdom, in order to secure them from the violence of their enemies. A few years after this, being seized with a dangerous sickness, her youngest son Aristobolus collected a strong party in order to secure the crown to himself; but the queen, being displeased with his conduct, appointed her other son Hyrcanus, whom she had before made high-priest, to succeed her also in the royal dignity. Soon after this she expired, and left her two sons competitors for the crown. The pharisees raised an army against Aristobolus, which almost instantly deserted to him, so that Hyrcanus found himself obliged to accept of peace upon any terms; which, however, was not granted, till the latter had abandoned all title both to the royal and pontifical dignity, and contented himself with the enjoyment of his peculiar patrimony as a private person.

But this deposition did not extinguish the party of Hyrcanus. A new cabal was raised by Antipater an Idumæan proselyte, and father of Herod the Great; who carried off Hyrcanus into Arabia, under pretence that his life was in danger if he remained in Judea. Here he applied to Aretas king of that country, who undertook to restore the deposed monarch; and for that purpose invaded Judea, defeated Aristobolus, and kept him closely besieged in Jerusalem. The latter had recourse to the Romans; and having bribed Scaurus, one of their generals, he defeated Aretas with the loss of 7000 of his men, and drove him quite out of the country. The two brothers next fell presents to Pompey, at that time commander in chief of all the Roman forces in the east, and whom they made the arbitrator of their differences. But he, fearing that Aristobolus, against whom he intended to declare, might obstruct his intended expedition against the Nabatheans, dismissed them with a promise, that as soon as he had subdued Aretas, he would come into Judea and decide their controversy.

This delay gave such offence to Aristobolus, that he suddenly departed for Judea without even taking leave of the Roman general, who on his part was no less offended at this want of respect. The consequence was, that Pompey entered Judea with those troops with which he had designed to act against the Nabatheans, and summoned Aristobolus to appear before him. The Jewish prince would gladly have been excused; but was forced by his own people to comply with Pompey's summons, to avoid a war with that general. He came accordingly more than once or twice to him, and was dismissed with great promises and marks of friendship. But at last Pompey insisted, that he should deliver into his hands all the fortified places he possessed; which let Aristobolus plainly see that he was in the interest of his brother, and upon this he fled to Jerusalem with a design to oppose the Romans to the utmost of his power. He was quickly followed by Pompey; and to prevent hostilities was at last forced to go and throw himself at the feet of the haughty Roman, and to promise him a considerable sum of money as the reward of his forbearance. This submission

16
Alexander Jannæus, a great conqueror.

17
Contentions between his sons Hyrcanus and Aristobolus.

18
The Romans called in by Aristobolus.

mission.

Jews.

million was accepted; but Gabinius, being sent with some troops to receive the stipulated sum, was repulsed by the garrison of Jerusalem, who shut the gates against him, and refused to fulfil the agreement. This disappointment so exasperated Pompey, that he immediately marched with his whole army against the city.

The Roman general first sent proposals of peace; but finding the Jews resolved to stand out to the last, he began the siege in form. As the place was strongly fortified both by nature and art, he might have found it very difficult to accomplish his design, had not the Jews been suddenly seized with a qualm of conscience respecting the observance of the sabbath-day. From the time of the Maccabees they had made no scruple of taking up arms against an offending enemy on the sabbath; but now they discovered, that tho' it was lawful on that day to stand on their defence in case they were actually attacked, yet it was unlawful to do any thing towards the preventing of those preparatives which the enemy made towards such future assaults. As therefore they never moved an hand to hinder the erection of mounds and batteries, or the making of breaches in their walls on the sabbath, the besiegers at last made such a considerable breach on that day, that the garrison could no longer resist them. The city was therefore taken in the year 63 B. C. 12,000 of the inhabitants were slaughtered, and many more died by their own hands; while the priests, who were offering up the usual prayers and sacrifices in the temple, chose rather to be butchered along with their brethren, than suffer divine service to be one moment interrupted. At last, after the Romans had satiated their cruelty with the death of a vast number of the inhabitants, Hyrcanus was restored to the pontifical dignity with the title of *prince*; but forbid to assume the title of *king*, to wear a diadem, or to extend his territories beyond the limits of Judea. To prevent future revolts, the walls were pulled down; and Scaurus was left governor with a sufficient force. But before he departed, the Roman general gave the Jews a still greater offence than almost any thing he had hitherto done; and that was by entering into the most sacred recesses of the temple, where he took a view of the golden table, candlestick, censers, lamps, and all the other sacred vessels; but out of respect to the Deity, forbore to touch any of them, and when he came out commanded the priests immediately to purify the temple according to custom.

Pompey having thus subdued the Jewish nation, set out for Rome, carrying along with him Aristobulus and his two sons Alexander and Antigonus, as captives to adorn his future triumph. Aristobulus himself and his son Antigonus were led in triumph; but Alexander found means to escape into Judea, where he raised an army of 10,000 foot and 1500 horse, and began to fortify several strong holds, from whence he made incursions into the neighbouring country. As for Hyrcanus, he had no sooner found himself freed from his rival brother, than he relapsed into his former indolence, leaving the care of all his affairs to Antipater, who, like a true politician, failed not to turn the weakness of the prince to his own advantage and the aggrandizing of his family. He foresaw, however, that he could not easily compass his ends, unless he ingratiated himself with the Romans; and therefore spared neither pains nor

cost to gain their favour. Scaurus soon after received from him a supply of corn and other provisions, without which his army, which he had led against the metropolis of Arabia, would have been in danger of perishing; and after this, he prevailed on the king to pay 300 talents to the Romans, to prevent them from ravaging his country. Hyrcanus was now in no condition to face his enemy Alexander; and therefore had again recourse to the Romans, Antipater at the same time sending as many troops as he could spare to join them. Alexander ventured a battle; but was defeated with considerable loss, and besieged in a strong fortress named *Alexandrión*. Here he would have been forced to surrender; but his mother, partly by her address, and partly by the services she found means to do the Roman general, prevailed upon him to grant her son a pardon for what was past. The fortresses were then demolished, that they might not give occasion to fresh revolts; Hyrcanus was again restored to the pontifical dignity; and the province was divided into five several districts, in each of which a separate court of judicature was erected. The first of these was at Jerusalem, the second at Gadara, the third at Amath, the fourth at Jericho, and the fifth at Sephoris in Galilee. Thus was the government changed from a monarchy to an aristocracy, and the Jews now fell under a set of domineering lords.

Soon after this, Aristobulus found means to escape from his confinement at Rome, and raised new troubles in Judea, but was again defeated and taken prisoner: his son also renewed his attempts; but was in like manner defeated, with the loss of near 10,000 of his followers; after which Gabinius, having settled the affairs of Judea to Antipater's mind, resigned the government of his province to Crassus. The only transaction during his government was his plundering the temple of all its money and sacred utensils, amounting in the whole to 10,000 Attic talents, *i. e.* above two millions of our money. After this sacrilege, Crassus set out on his expedition against Parthia, where he perished; and his death was by the Jews interpreted as a divine judgment for his impiety.

The war between Cæsar and Pompey afforded the Jews some respite, and likewise an opportunity of ingratiating themselves with the former, which the politic Antipater readily embraced. His services were rewarded by the emperor. He confirmed Hyrcanus in his priesthood, added to it the principality of Judea to be entailed on his posterity for ever, and restored the Jewish nation to their ancient rights and privileges; ordering at the same time a pillar to be erected, whereon all these grants, and his own decree, should be engraved, which was accordingly done; and soon after, when Cæsar himself came into Judea, he granted liberty also to fortify the city, and rebuild the wall which had been demolished by Pompey.

During the lifetime of Cæsar, the Jews were so highly favoured, that they could scarcely be said to feel the Roman yoke. After his death, however, the nation fell into great disorders; which were not finally quelled, till Herod, who was created king of Judea by Marc Anthony in 40 B. C. was fully established on the throne by the taking of Jerusalem by his allies the Romans in 37 B. C. The immediate consequence of this was another cruel pillage and massacre: then fol-

Jews.

20
Jewish go-
vernment
changed
into an
aristocracy.

28
Jews fa-
voured by
Cæsar.

22
Herod
raised to
the Jewish
throne.

lowed the death of Antigonus the son of Aristobolus, who had for three years maintained his ground against Herod, put to death his brother Phasael, and cut off Hyrcanus's ears, in order the more effectually to incapacitate him for the high-priesthood.

23
His tyranny
and cruelty.

The Jews gained but little by this change of matters. The new king proved one of the greatest tyrants mentioned in history. He began his reign with a cruel persecution of those who had sided with his rival Antigonus; great numbers of whom he put to death, seizing and confiscating their effects for his own use. Nay, such was his jealousy in this last respect, that he caused guards to be placed at the city-gates, in order to watch the bodies of those of the Antonian faction who were carried out to be buried, lest some of their riches should be carried along with them. His jealousy next prompted him to decoy Hyrcanus, the banished pontiff, from Parthia, where he had taken refuge, that he might put him to death, tho' contrary to his most solemn promises. His cruelty then fell upon his own family. He had married Mariamne, the daughter of Hyrcanus; whose brother, Aristobolus, a young prince of great hopes, was made high-priest at the intercession of his mother Alexandra. But the tyrant, conscious that Aristobolus had a better right to the kingdom than himself, caused him soon after to be drowned in a bath. The next victim was his beloved queen Mariamne herself. Herod had been summoned to appear first before Marc Anthony, and then before Augustus, in order to clear himself from some crimes laid to his charge. As he was, however, doubtful of the event, he left orders, that in case he was condemned, Mariamne should be put to death. This, together with the death of her father and brother, gave her such an aversion for him, that she shewed it on all occasions. By this conduct the tyrant's resentment was at last so much inflamed, that having got her falsely accused of infidelity, she was condemned to die, and executed accordingly. She suffered with great resolution; but with her ended all the happiness of her husband. His love for Mariamne increased so much after her death, that for some time he appeared like one quite distracted. His remorse, however, did not get the better of his cruelty. The death of Mariamne was soon followed by that of her mother Alexandra, and this by the execution of several other persons who had joined with her in an attempt to secure the kingdom to the sons of the deceased queen.

Herod, having now freed himself from the greatest part of his supposed enemies, began to shew a greater contempt for the Jewish ceremonies than formerly; and introduced a number of heathenish games, which made him odious to his subjects. Ten bold fellows at last took it into their heads to enter the theatre where the tyrant was celebrating some games, with daggers concealed under their clothes, in order to stab him or some of his retinue. In case they should miscarry in the attempt, they had the desperate satisfaction to think, that, if they perished, the tyrant would be rendered still more odious by the punishment inflicted on them. They were not mistaken: for Herod being informed of their design by one of his spies, and causing the assassins to be put to a most excruciating death, the people were so much exasperated against the informer, that they cut and tore him to pieces, and cast his flesh

to the dogs. Herod tried in vain to discover the authors of this affront; but at last having caused some women to be put to the rack, he extorted from them the names of the principal persons concerned, whom he caused immediately to be put to death with their families. This produced such disturbances, that, apprehending nothing less than a general revolt, he set about fortifying Jerusalem with several additional works, rebuilding Samaria, and putting garrisons into several fortresses in Judea. Notwithstanding this, however, Herod had shortly after an opportunity of regaining the affections of his subjects in some measure, by his generosity to them during a famine; but as he soon relapsed into his former cruelty, their love was again turned into hatred, which continued till his death.

Herod now, about 23 B. C. began to adorn his cities with many stately buildings. The most remarkable and magnificent of them all, however, was the temple at Jerusalem, which he is said to have raised to a higher pitch of grandeur than even Solomon himself had done. Ten thousand artificers were immediately set to work, under the direction of 1000 priests, the best skilled in carving, masonry, &c. all of whom were kept in constant pay. A thousand carts were employed in fetching materials; and such a number of other hands were employed, that every thing was got ready within the space of two years. After this they set about pulling down the old building, and rearing up the new one with the same expedition: so that the *holy place*, or temple properly so called, was finished in a year and an half; during which we are told that it never rained in the day-time, but only in the night. The remainder was finished in somewhat more than eight years. The *temple*, properly so called, or holy place, was but 60 cubits high, and as many in breadth; but in the front he added two wings or shoulders which projected 20 cubits more on each side, and which in all made a front of 120 cubits in length, and as many in height; with a gate 70 cubits high and 20 in breadth, but open and without any doors. The stones were white marble, 25 cubits in length, 12 in height, and nine in breadth, all wrought and polished with exquisite beauty; the whole resembling a stately palace, whose middle being considerably raised above the extremities of each face, made it afford a beautiful vista at a great distance, to those who came to the metropolis. Instead of doors, the gates closed with very costly veils, enriched with a variety of flowering of gold, silver, purple, and every thing that was rich and curious; and on each side of the gates were planted two stately columns, from whose cornices hung golden festoons and vines, with their clusters of grapes, leaves, &c. curiously wrought. The superstructure, however, which was probably reared on the old foundation without sufficient additions, proved too heavy, and sunk down about 20 cubits; so that its height was reduced to 100. This foundation was of an astonishing strength and height, of which an account is given under the article JERUSALEM. The platform was a regular square of a fadde or furlong on each side. Each front of the square had a spacious gate or entrance, enriched with suitable ornaments; but that on the west had four gates, one of which led to the palace, another

24
Rebuilds
the temple.

another to the city, and the two others to the suburbs and fields. This inclosure was surrounded on the outside with a strong and high wall of large stones, well cemented; and on the inside, had on each front a stately piazza or gallery, supported by columns of such a bigness, that three men could but just embrace them, their circumference being about 27 feet. There were in all 162 of them, which supported a cedar ceiling of excellent workmanship, and formed three galleries, the middlemost of which was the largest and highest, it being 45 feet in breadth and 100 in height, whereas those on each side were but 30 feet wide and 50 in height.

The piazzas and court were paved with marble of various colours; and, at a small distance from the galleries, was a second inclosure, surrounded with a flight of beautiful marble rails, with stately columns at proper distances, on which were engraven certain admonitions in Greek and Latin, to forbid strangers, and those Jews that were not purified, to proceed farther under pain of death. This inclosure had but one gate on the east side; none on the west; but on the north and south it had three, placed at equal distances from each other.

A third inclosure surrounded the temple properly so called, and the altar of burnt-offerings; and made what they called the court of the Hebrews, or Israelites. It was square like the rest: but the wall on the outside was surrounded by a flight of 14 steps, which hid a considerable part of it; and on the top was a terrace, of about 12 cubits in breadth, which went quite round the whole inclosure. The east side had but one gate; the west none; and the north and south four, at equal distances. Each gate was ascended by five steps more, before one could reach the level of the inward court; so that the wall which inclosed it appeared within to be but 25 cubits high, though considerably higher on the outside. On the inside of each of those gates were raised a couple of spacious square chambers, in form of a pavilion, 30 cubits wide and 40 in height, each supported by columns of 12 cubits in circumference.

This inclosure had likewise a double flight of galleries on the inside, supported by a double row of columns; but the western side was only one continued wall, without gates or galleries. The women had likewise their particular courts separate from that of the men, and one of the gates on the north and south leading to it.

The altar of burnt-offerings was likewise high and spacious, being 40 cubits in breadth, and 15 in height. The ascent to it was, according to the Mosaic law, smooth, and without steps; and the altar of unleavened stones. It was surrounded, at a convenient distance, with a low wall or rail, which divided the court of the priests from that of the lay Israelites; so that these last were allowed to come thus far to bring their offerings and sacrifices; though none but the priests were allowed to come within that inclosure.

Herod caused a new dedication of this temple to be performed with the utmost magnificence; and presented to it many rich trophies of his former victories, after the custom of the Jewish monarchs.

This, and many other magnificent works, however, did not divert the king's attention from his usual jealousies and cruelty. His sister Salome, and one of his sons named *Antipater*, taking advantage of this disposition, prompted him to murder his two sons by Marianna, named *Alexander* and *Arifobulus*, who had been educated at the court of Augustus in Italy, and were justly admired by all who saw them. His cruelty soon after broke out in an impotent attempt to destroy the Saviour of the world, but which was attended with no other consequence than the destruction of 2000 innocent children of his own subjects. His misery was almost brought to its summit by the discovery of Antipater's designs against himself; who was accordingly tried and condemned for treason. Something still more dreadful, however, yet awaited him; he was seized with a most loathsome and incurable disease, in which he was tormented with intolerable pains, so that his life became a burden. At last he died, to the great joy of the Jews, five days after he had put Antipater to death, and after having divided his kingdom among his sons in the following manner.—Archelaus had Judea; Antipas, or Herod, was tetrarch of Galilee and Peraea; and Philip had the regions of Trachonitis, Gaulon, Batanea, and Panias, which he erected likewise into a tetrarchy. To his sister Salome he gave 50,000 pieces of money, together with the cities of Jamnia, Azotus, and Phaelias; besides some considerable legacies to his other relations.

The cruelty of this monster accompanied him to his grave; nay, he in a manner carried it beyond the grave. Being well apprised that the Jews would rejoice at being freed from such a tyrant, he bethought himself of the following infernal stratagem to damp their mirth. A few days before his death, he summoned all the heads of the Jews to repair to Jericho under pain of death; and, on their arrival, ordered them all to be shut up in the circus, giving at the same time strict orders to his sister Salome and her husband to have all the prisoners butchered as soon as his breath was gone out. "By this means, (said he,) I shall not only damp the people's joy, but secure a real mourning at my death." These cruel orders, however, were not put in execution. Immediately after the king's death, Salome went to the Hippodrome, where the heads of the Jews were detained, caused the gates to be flung open, and declared to them, that now the king had no farther occasion for their attendance, and that they might depart to their respective homes; after which, and not till then, the news of the king's death was published. Tumults, seditions, and insurrections, quickly followed. Archelaus was opposed by his brethren, and obliged to appear at Rome before Augustus, to whom many complaints were brought against him. After hearing both parties, the emperor made the following division of the kingdom: Archelaus had one-half, under the title of *ethnarch*, or governor of a nation; together with a promise that he should have the title of *king*, as soon as he shewed himself worthy of it. This ethnarchy contained Judea Propria, Idumea, and Samaria: but this last was exempted from one-fourth of the taxes paid by the rest, on account of the peaceable behaviour of the inhabitants during the late tumults. The remainder:

25
His death.

26
New division of the kingdom by Augustus.

Jews.

remainder was divided between Philip and Herod; the former of whom had Trachonitis, Batanea, and Auranitis, together with a small part of Galilee; the latter had the rest of Galilee, and the countries beyond the Jordan: Salome had half a million of silver, together with the cities of Jamnia, Azotus, Phasaelis, and Afcalon.

For some years Archelans enjoyed his government in peace; but at last, both Jews and Samaritans, tired out with his tyrannical behaviour, joined in a petition to Augustus against him. The emperor immediately summoned him to Rome, where, having heard his accusation and defence, he banished him to the city of Vienne in Dauphiny, and confiscated all his effects. Judea being by this sentence reduced to a Roman province, was ordered to be taxed; and Cyrenius the governor of Syria, a man of consular dignity, was sent thither to see it put in execution: which having done, and sold the palaces of Archelaus, and seized upon all his treasure, he returned to Antioch, leaving the Jews in no small ferment on account of this new tax.

Thus were the seeds of dissension sown between the Jews and Romans, which ended in the most lamentable catastrophe of the former. The Jews, always impatient of a foreign yoke, knew from their prophecies, that the time was now come when the Messiah should appear. Of consequence, as they expected him to be a great and powerful warrior, their rebellious and seditious spirit was heightened to the greatest degree; and they imagined they had nothing to do but take up arms, and victory would immediately declare on their side. From this time, therefore, the country was never quiet; and the insatuated people, while they rejected the true Messiah, gave themselves up to the direction of every impostor who chose to lead them to their own destruction. The governors appointed by the Romans were also frequently changed, but seldom for the better. About the 16th year of Christ, Pontius Pilate was appointed governor; the whole of whose administration, according to Josephus, was one continued scene of venality, rapine, tyranny, and every wicked action; of racking and putting innocent men to death, untried and uncondemned; and of every kind of savage cruelty. Such a governor was but ill calculated to appease the ferments occasioned by the late tax. Indeed Pilate was so far from attempting this, that he greatly inflamed them by taking every occasion of introducing his standards with images and pictures, consecrated shields, &c. into their city; and at last attempting to drain the treasury of the temple, under pretence of bringing an aqueduct into Jerusalem. The most remarkable transaction of his government, however, was his condemnation of Jesus Christ: seven years after which he was removed from Judea; and in a short time Agrippa the grandson of Herod the Great, was promoted by Caius to the regal dignity. He did not, however, long enjoy this honour; for, on his coming into Judea, having raised a persecution against the Christians, and blasphemously suffering himself to be styled a God by some deputies from Tyre and Sidon, he was miraculously struck with a disease, which soon put an end to his life. The sacred historian tells us, that he was

eaten of worms; and Josephus, that he was seized with most violent pains in his heart and bowels; so that he could not but reflect on the baseness of those flatterers, who had but lately complimented him with a kind of divine immortality, that was now about to expire in all the torments and agonies of a miserable mortal.

On the death of Agrippa, Judea was once more reduced to a province of the Roman empire, and had new governors appointed over it. These were Ventidius, Felix, Festus, Albinus, and Gessius Florus. Under their government the Jewish affairs went on from bad to worse; the country swarmed with robbers and assassins; the latter committing every-where the most unheard-of cruelties under the pretence of religion; and about 64 A. C. were joined by 18,000 workmen, who had been employed in further repairing and beautifying the temple. About this time also, Gessius Florus, the last and worst governor the Jews ever had, was sent into the country. Josephus seems at a loss for words to describe him by, or a monster to compare him to. His rapines, cruelties, conniving for large sums with the banditti, and, in a word, his whole behaviour, were so open and barefaced, that he was looked upon by the Jews more like a bloody executioner sent to butcher, than a magistrate to govern them. In this distracted state of the country, many of the inhabitants forsook it to seek for an asylum somewhere else; while those who remained, applied themselves to Cestius Gallus, governor of Syria, who was at Jerusalem at the passover; beseeching him to pity their unhappy state, and free them from the tyranny of a man who had totally ruined their country. Florus, who was present when these complaints were brought against him, made a mere jest of them; and Cestius, instead of making a strict inquiry into his conduct, dismissed the Jews with a general promise that the governor should behave better for the future; and set himself about computing the number of Jews at that time in Jerusalem, by the number of lambs offered at that festival, that he might send an account of the whole to Nero. By his computation, there were at that time in Jerusalem 2,556,000; tho' Josephus thinks they rather amounted to 3,000,000.

In the year 67 began the fatal war with the Romans, which was ended only by the destruction of Jerusalem. The immediate cause was the decision of a contest with the Syrians concerning the city of Cæsarea. The Jews maintained that this city belonged to them, because it had been built by Herod; and the Syrians pretended that it had always been reckoned a Greek city, since even that monarch had reared temples and statues in it. The contest at last came to such a height, that both parties took up arms against each other. Felix put an end to it for a time, by sending some of the chiefs of each nation to Rome, to plead their cause before the emperor, where it hung in suspense till this time, when Nero decided it against the Jews. No sooner was this decision made public, than the Jews in all parts of the country flew to arms; and, tho' they were every-where the sufferers, yet, from this fatal period, their rage never abated. Nothing was now to be heard of but robberies, murders,

Jews.

29
The kingdom again reduced to a Roman province.

27
Archelaus banished, and a Roman governor appointed over Judea.

28
Agrippa made king.

30
Cause of the last war with the Romans.

Jews.

31
The Jews
cribly
massacred.

and every kind of cruelty. Cities and villages were filled with dead bodies of all ages, even sucking babes. The Jews, on their part, spared neither Syrians nor Romans, where they got the better of them; and this proved the destruction of great numbers of their peaceful brethren: 20,000 were massacred at Cæsarea, 50,000 at Alexandria, 2000 at Ptolemais, and 3,500 at Jerusalem.

32
they de-
cided
Cælius
allus.

A great number of assassins, in the mean time, having joined the factions Jews in Jerusalem, they beat the Romans out of Antonia, a fortress adjoining to the temple, and another called *Masada*; and likewise out of the towers called *Phasael* and *Mariamne*, killing all who opposed them. The Romans were at last reduced to such straits, that they capitulated on the single condition that their lives should be spared; notwithstanding which, they were all massacred by the furious zealots: and this treachery was soon revenged on the faithful Jews of Scythopolis. These had offered to assist in reducing their factious brethren; but, their sincerity being suspected by the townsmen, they obliged them to retire into a neighbouring wood, where, on the third night, they were massacred to the number of 13,000, and all their wealth carried off. The rebels, in the mean time, crossed the Jordan, and took the fortresses of Machæron and Cyprus; which last they razed to the ground, after having put all the Romans to the sword.—This brought Cælius Gallus, the Syrian governor, into Judæa with all his forces; but the Jews, partly by treachery and partly by force, got the better of him, and drove him out of the country with the loss of 5000 men.

33
Vespasian
not against
em.

All this time such dreadful dissensions reigned among the Jews, that great numbers of the better sort, foreseeing the sad effects of the resentment of the Romans, left the city as men do a sinking vessel; and the Christians, mindful of their Saviour's prediction, retired to Pella, a city on the other side of Jordan, whither the war did not reach. Miserable was the fate of such as either could not, or would not, leave that devoted city. Vespasian was now ordered to leave Greece where he was at that time, and to march with all speed into Judæa. He did so accordingly at the head of a powerful army, ordering his son Titus in the mean time to bring two more legions from Alexandria; but before he could reach that country, the Jews had twice attempted to take the city of Ascalon, and were each time repulsed with the loss of 10,000 of their number. In the beginning of the year 68, Vespasian entered Galilee at the head of an army of 60,000 men all completely armed and excellently disciplined. He first took and burnt Gadara; then he laid siege to Jotapa, and took it after a stout resistance; at which he was so provoked, that he caused every one of the Jews to be massacred or carried into captivity, not one being left to carry the dreadful news to their brethren. Forty thousand perished on this occasion; only 1200 were made prisoners, among whom was Josephus the Jewish historian. Japha next shared the same fate, after an obstinate siege; all the men being massacred, and the women and children carried into captivity. A week after this the Samaritans, who had assembled on Mount Gerizzim, were almost all put to the sword, or perished. Joppa fell the next victim

Jews.

to the Roman vengeance. It had been formerly laid waste by Cælius; but was now reoppressed and fortified by the seditious Jews who infested the country. It was taken by storm, and shared the same fate with the rest. Four thousand Jews attempted to escape, by taking to their ships; but were driven back by a sudden tempest, and all of them were drowned or put to the sword. Tarichea and Tiberias were next taken, but part of their inhabitants were spared on account of their peaceable dispositions. Then followed the sieges of Gamala, Gischala, and Itabyr. The first was taken by storm, with a dreadful slaughter of the Jews; the last by stratagem. The inhabitants of Gischala were inclineable to surrender: but a seditious Jew of that town, named *John*, the son of Levi, head of the faction, and a vile fellow, opposed it; and, having the mob at his beck, overawed the whole city. On the sabbath he begged of Titus to forbear hostilities till to-morrow, and then he would accept his offer; but instead of that, he fled to Jerusalem with as many as would follow him. The Romans, as soon as they were informed of his flight, pursued, and killed 6000 of his followers on the road, and brought back near 3000 women and children prisoners. The inhabitants then surrendered to Titus, and only the factious were punished; and this completed the reduction of Galilee.

34
Different
factions
among the
Jews.

The Jewish nation by this time was divided into two very opposite parties: the one foreseeing that this war, if continued, must end in the total ruin of their country, were for putting an end to it by submitting to the Romans; the other, which was the remains of the faction of Judas Gaulonites, breathed nothing but war and confusion, and opposed all peaceable measures with invincible obstinacy. This last, which was by far the most numerous and powerful, consisted of men of the vilest and most profligate characters that can be paralleled in history. They were proud, ambitious, cruel, rapacious, and committed the most horrid and unnatural crimes under the mask of religion. They affirmed every where, that it was offering the greatest dishonour to God to submit to any earthly potentate; much less to Romans and to heathens. This, they said, was the only motive that induced them to take up arms, and to bind themselves under the strictest obligations not to lay them down till they had either totally extirpated all foreign authority, or perished in the attempt.—This dreadful dissension was not confined to Jerusalem, but had infected all the cities, towns, and villages, of Palestine. Even houses and families were so divided against each other, that, as our Saviour had expressly foretold, a man's greatest enemies were often those of his own family and household. In short, if we may believe Josephus, the zealots acted more like incarnate devils than like men who had any sense of humanity left them.—This obliged the contrary party likewise to rise up in arms in their own defence against those miscreants; from whom, however, they suffered much more than they did even from the exasperated Romans.—The zealots began their outrages by murdering all that opposed them in the countries round about. Then they entered Jerusalem; but met with a stout opposition from the other party headed by Ananias, who had lately been high-priest. A fierce engage-

35
Cruelty of
the zealots.

ment.

Jews.

ment ensued between them; and the zealots were driven into the inner cincture of the temple, where they were closely besieged. John of Gischala above mentioned, who had pretended to side with the peaceable party, was then sent with terms of accommodation; but, instead of advising the besieged to accept of them, he persuaded them still to hold out, and call the Idumeans to their assistance. They did so, and procured 20,000 of them to come to their relief; but these new allies were refused admittance into the city. On that night, however, there happened such a violent storm, accompanied with thunder, lightning, and an earthquake, that the zealots from within the inner court saw the bolts and hinges of the temple-gates without being heard, forced the guards of the besiegers, sallied into the city, and let in the Idumeans. The city was instantly filled with butcheries of the most horrid kind. Barely to put any of the opposite party to death, was thought too mild a punishment; they must have the pleasure of murdering them by inches: so that they made it now their diversion to put them to the most exquisite tortures that could be invented; nor could they be prevailed upon to dispatch them till the violence of their torments had rendered them quite incapable of feeling them. In this manner perished 12,000 persons of noble extraction, and in the flower of their age; till at last the Idumeans complained so much against the putting such numbers to death, that the zealots thought proper to erect a kind of tribunal, which, however, was intended not for judgment, but condemnation; for the judges having once acquitted a person who was manifestly innocent, the zealots not only murdered him in the temple, but deposed the new-created judges as persons unfit for their office.

The zealots, after having exterminated all those of any character or distinction, began next to wreak their vengeance on the common people. This obliged many of the Jews to forsake Jerusalem, and take refuge with the Romans, though the attempt was very hazardous; for the zealots had all the avenues well guarded, and failed not to put to death such as fell into their hands. Vespasian in the mean time staid at Cæsarea an idle spectator of their outrages; well knowing that the zealots were fighting for him, and that the strength of the Jewish nation was gradually wasting away. Every thing succeeded to his wish. The zealots, after having massacred or driven away the opposite party, turned their arms against each other. A party was formed against John, under one Simon who had his head-quarters at the fortrefs of Massada. This new miscreant plundered, burned, and massacred, wherever he came, carrying the spoil into the fortrefs above-mentioned. To increase his party, he caused a proclamation to be published, by which he promised liberty to the slaves, and proportionable encouragement to the freemen who joined him. This stratagem had the desired effect, and he soon saw himself at the head of a considerable army. Not thinking himself, however, as yet master of force sufficient to besiege Jerusalem, he invaded Idumea with 20,000 men. The Idumeans opposed him with 25,000; and a sharp engagement ensued, in which neither party was victorious. But Simon, soon after, having corrupted the Idumean general, got their army

delivered up to him. By this means he easily became master of the country; where he committed such cruelties, that the miserable inhabitants abandoned it to seek for shelter in Jerusalem.

In the city, matters went in the same way. John tyrannized in such a manner, that the Idumeans revolted, killed a great number of his men, plundered his palace, and forced him to retire into the temple. In the mean time the people, having taken a notion that he would fall out in the night and set fire to the city, called a council, in which it was resolved to admit Simon with his troops, in order to oppose John and his zealots. Simon's first attempt against his rival, however, was ineffectual, and he was obliged to content himself with besieging the zealots in the temple. In the mean time the miseries of the city were increased by the starting up of a third party headed by one Eleazar, who seized on the court of the priests, and kept John confined within that of the Israelites. Eleazar kept the avenues so well guarded, that none were admitted to come into that part of the temple but those who came thither to offer sacrifices; and it was by these offerings chiefly that he maintained himself and his men. John by this means found himself hemmed in between two powerful enemies, Simon below, and Eleazar above. He defended himself, however, against them both with great resolution; and when the city was invested by the Romans, having pretended to come to an agreement with his rivals, he found means totally to cut off or force Eleazar's men to submit to him, so that the factions were again reduced to two.

The Romans, in the year 72, began to advance towards the capital. In their way they destroyed many thousands, wasting the country as they went along; and in the year 73 arrived before the walls of Jerusalem, under Titus afterwards emperor. As he was a man of an exceedingly merciful disposition, and greatly desired to spare the city, he immediately sent offers of peace; but these were rejected with contempt, and he himself put in great danger of his life, so that he resolved to begin the siege in form. In the mean time, Simon and John renewed their hostilities with greater fury than ever. John now held the whole temple, some of the out-parts of it, and the valley of Cedron. Simon had the whole city to range in; in some parts of which John had made such devastations, that they served them for a field of battle, from which they sallied unanimously against the common enemy whenever occasion served; after which they returned to their usual hostilities, turning their arms against each other, as if they had sworn to make their ruin more easy to the Romans. These drew still nearer to the walls, having with great labour and pains levelled all the ground between Scopas and them, by pulling down all the houses and hedges, cutting down the trees, and even cleaving the rocks that stood in their way, from Scopas to the tomb of Herod, and Bethara or the pool of serpents; in which work so many hands were employed, that they finished it in four days.

Whilst this was doing, Titus sent the besieged some offers of peace; and Josephus was pitched upon to be the messenger of them: but they were rejected with indignation. He sent a second time Nicanor and Josephus with fresh offers, and the former received a

Jews.

³⁶
The Romans advance to Jerusalem.

³⁵
They turn their arms against each other.

³⁷
Offers of peace rejected.

wound

Jews.

wound in his shoulder; upon which Titus resolved to begin the assault in good earnest, and ordered his men to rase the suburbs, cut down all the trees, and use the materials to raise platforms against the wall. Every thing was now carried on with invincible ardour; the Romans began to play their engines against the city with all their might. The Jews had likewise their machines upon the walls, which they plied with uncommon fury: they had taken them lately from Cestius; but were so ignorant in their use, that they did little execution with them, till they were better instructed by some Roman deserters: till then, their chief success was rather owing to their frequent sallies; but the Roman legions, who had all their towers and machines before them, made terrible havock. The least stones they threw were near 100 weight; and these they could throw the length of a quarter of a mile against the city, and with such a force, that they could do mischief on those that stood at some distance behind them. Titus had reared three towers 50 cubits high; one of which happening to fall in the middle of the night, greatly alarmed the Roman camp, who immediately ran to arms at the noise of it; but Titus, upon knowing the cause, dismissed them, and caused it to be set up again. These towers, being plaited with iron, the Jews tried in vain to set fire to them, but were at length forced to retire out of the reach of their shot; by which the battering-rams were now at full liberty to play against the wall. A breach was soon made in it, at which the Romans entered; and the Jews, abandoning this last inclosure, retired behind the next. This happened about the 28th of April, a fortnight after the beginning of the siege.

John defended the temple and the castle of Antonia, and Simon the rest of the city. Titus marched close to the second wall, and plied his battering-rams so furiously, that one of the towers, which looked towards the north, gave a prodigious shake. The men who were in it, made a signal to the Romans, as if they would surrender; and, at the same time, sent Simon word to be ready to give them a warm reception. Titus, having discovered their stratagem, plied his work more furiously, whilst the Jews that were in the tower set it on fire, and flung themselves into the flames. The tower being fallen, gave them an entrance into the second inclosure, five days after gaining the first; and Titus, who was bent on saving the city, would not suffer any part of the wall or streets to be demolished; which left the breach and lanes so narrow, that when his men were furiously repulsed by Simon, they had not room enough to make a quick retreat, so that there was a number of them killed in it. This oversight was quickly rectified; and the attack renewed with such vigour, that the place was carried four days after their first repulse.

The famine, raging in a terrible manner in the city, was soon followed by a pestilence; and as these two dreadful judgments increased, so did the rage of the factious, who, by their intestine feuds, had destroyed such quantities of provision, that they were forced to prey upon the people with the most unheard-of cruelty. They forced their houses; and, if they found any victuals in them, they butchered them for not appropriating them of it; and, if they found nothing but bare walls, which was almost every where the case, they

VOL. V.

put them to the most severe tortures, under pretence that they had some provision concealed. "I should (says Josephus) undertake an impossible task, were I to enter into a detail of all the cruelties of those impious wretches; it will be sufficient to say, that I do not think, that since the creation any city ever suffered such dreadful calamities, or abounded with men so fertile in all kind of wickedness."

Titus, who knew their miserable condition, and was still willing to spare them, gave them four days to cool; during which he caused his army to be mulctured, and provisions to be distributed to them in sight of the Jews, who looked upon the walls to see it. Josephus was sent to speak to them afresh, and to exhort them not to run themselves into an inevitable ruin by obstinately persisting in the defence of a place which could hold out but a very little while, and which the Romans looked upon already as their own. But this stubborn people, after many bitter invectives, began to dart their arrows at him; at which, not at all discouraged, he went on with greater vehemence: but all the effect it wrought on them was, that it prevailed on great numbers to steal away privately to the Romans, whilst the rest became only the more desperate and resolute to hold out to the last, in spite of Titus's merciful offers.

To hasten therefore their destined ruin, he caused the city to be surrounded with a strong wall, to prevent either their receiving any succours or provision from abroad, or their escaping his resentment by flight. This wall, which was near 40 stades or five miles in circuit, was yet carried on with such speed, and by so many hands, that it was finished in three days; by which one may guess at the ardour of the besiegers to make themselves masters of the city.

There was now nothing to be seen thro' the streets of Jerusalem, but heaps of dead bodies rotting above ground, walking skeletons, and dying wretches. As many as were caught by the Romans in their sallies, Titus caused to be crucified in sight of the town, to inject a terror among the rest: but the zealots gave it out, that they were those who fled to him for protection; which when Titus understood, he sent a prisoner with his hands cut off to undeceive, and assure them, that he spared all that voluntarily came over to him; which encouraged great numbers to accept his offers, tho' the avenues were closely guarded by the factious, who put all to death who were caught going on that errand. A greater mischief than that was, that even those who escaped safe to the Roman camp were miserably butchered by the soldiers, from a notion which these had taken that they had swallowed great quantities of gold; inasmuch that two thousand of them were ripped up in one night, to come at their supposed treasure. When Titus was apprised of this barbarity, he would have condemned all those butchering wretches to death; but they proved so numerous, that he was forced to spare them, and contented himself with sending a proclamation thro' his camp, that as many as should be suspected thenceforward of that horrid villany, should be put to immediate death: yet did not this deter many of them from it, only they did it more privately than before; so greedy were they of that bewitching metal. All this while the defection increased still more thro' the inhumanity of the faction

22 B

with-

Jews.

Jo.
Offers of
peace rejected.

38
the siege
ended on
with vigour.

39
famine and
pestilence in
the city.

Jews.

within, who made the miseries and dying groans of their starving brethren the subject of their cruel mirth, and carried their barbarity even to the sheathing of their swords in sport in those poor wretches, under pretence of trying their sharpnels.

When they found therefore, that neither their guards nor severities could prevent the people's flight, they had recourse to another stratagem equally impious and cruel; which was, to hire a pack of vile pretenders to prophecy, to go about and encourage the despairing remains of the people to expect a speedy and miraculous deliverance; and this imposture proved a greater expedient with that insatuated nation, than their other precautions.

Nothing could be more dreadful than the famished condition to which they were now reduced. The poor, having nothing to trust to but the Romans mercy or a speedy death, ran all hazards to get out of the city; and if in their flight, and wandering out for herbs or any other sustenance, they fell into the hands of any of Titus's parties sent about to guard the avenues, they were unmercifully scourged and crucified if they made the least resistance. The rich within the walls were now forced, tho' in the most private manner, to give half, or all they were worth, for a measure of wheat, and the middling sort for one of barley. This they were forced to convey into some private place in their houses, and to feed upon it as it was, without daring to pound or grind it, much less to boil or bake it, lest the noise or smell should draw the rapacious zealots to come and tear it from them. Not that these were reduced to any real want of provisions, but they had a double end in this barbarous plunder; to wit, the starving what they cruelly styled all useless persons, and the keeping their own stores in reserve. It was upon this sad and pinching juncture, that an unhappy mother was reduced to the extremity of butchering and eating her own child.

When this news was spread thro' the city, the horror and consternation were as universal as they were inexpressible. It was then that they began to think themselves forsaken by the Divine Providence, and to expect the most terrible effects of his anger against the poor remains of their nation; insomuch that they began to envy those that had perished before them, and to wish their turn might come before the sad expected catastrophe. Their fears were but too just; since Titus, at the very first hearing of this inhuman deed, swore the total extirpation of city and people. "Since," (said he,) they have so often refused my proffers of pardon, and have preferred war to peace, rebellion to obedience, and famine, such a dreadful one especially, to plenty, I am determined to bury that cursed metropolis under its ruins, that the sun may never shoot his beams on a city where the mothers feed on the flesh of their children, and the fathers, no less guilty than they, choose to drive them to such extremities, rather than lay down their arms."

This dreadful action happened about the end of July, by which time the Romans, having pursued their attacks with fresh vigour, made themselves masters of the fortress Antonia; which obliged the Jews to set fire to those stately galleries which joined it to the temple, lest they should afford an easy passage to the besiegers into this last. About the same time Titus,

with much difficulty, got materials for raising new mounds and terraces, in order to hasten the siege, and save, if possible, the sad remains of that once glorious structure; but his pity proved still worse and worse belowed on those obstinate wretches, who only became the more furious and desperate by it. Titus at length caused fire to be set to the gates, after having had a very bloody encounter, in which his men were repulsed with loss. The Jews were so terrified at it, that they suffered themselves to be devoured by the flames, without attempting either to extinguish them, or save themselves. All this while Josephus did not cease exhorting the insatuated people to surrender, to represent to them the dreadful consequences of an obstinate resistance, and to assure them that it was out of mere compassion to them that he thus hazarded his own life to save theirs: he received one day such a wound in his head by a stone from the battlements, as laid him for dead on the ground. The Jews sallied out immediately, to have seized on his body; but the Romans proved too quick and strong for them, and carried him off.

By this time the two factions within, but especially that of John, having plundered rich and poor of all they had, fell also on the treasury of the temple, whence John took a great quantity of golden utensils, together with those magnificent gifts which had been presented to that sacred place by the Jewish kings, by Augustus, Livia, and many other foreign princes, and melted them all to his own use. The repositories of the sacred oil which was to maintain the lamps, and of the wine which was reserved to accompany the usual sacrifices, were likewise seized upon, and turned into common use; and the last of this to such excess, as to make himself and his party drunk with it. All this while, not only the zealots, but many of the people, were still under such an insatiation, that tho' the fortress Antonia was lost, and nothing left but the temple, which the Romans were preparing to batter down, yet they could not persuade themselves, that God would suffer that holy place to be taken by heathens, and were still expecting some sudden and miraculous deliverance. Even that vile monster John, who commanded them, either seemed confident of it, or else endeavoured to make them think him so. For, when Josephus was sent for the last time to upbraid his obstinately exposing that sacred building, and the miserable remains of God's people, to sudden and sure destruction, he only answered him with the bitterest invectives; adding, that he was defending the Lord's vineyard, which he was sure could not be taken by any human force. Josephus in vain reminded him of the many ways by which he had polluted both city and temple; and in particular of the seas of blood which he caused to be shed in both those sacred places, and which, he assured him from the old prophecies, were a certain sign and forerunner of their speedy surrender and destruction. John remained as inflexible as if all the prophets had assured him of a deliverance; till at length Titus, foreseeing the inevitable ruin of that stately edifice, which he was still extremely desirous to save, vouchsafed even himself to speak to them, and to persuade them to surrender. But the factious, looking upon this condescension as the effects of his fear rather than generosity, only grew the more

Jews.

41
Miserable
condition
of the Jews.

42
A mother
eats her
own child.

43
Titus
swears the
total ruin
of the city.

44
John plun-
ders the
temple.

Jews.

more furious upon it, and forced him at last to come to those extremities, which he had hitherto endeavoured to avoid. That his army, which was to attack the temple, might have the freer passage towards it thro' the castle Antonia, he caused a considerable part of the wall to be pulled down, and levelled; which proved so very strong, that it took him up seven whole days, by which time they were far advanced in the month of July.

45
the daily
sacrifice in-
terrupted.

It was on the 17th day of that month, as all Josephus's copies have it, that the daily sacrifice ceased for the first time since its restoration by the brave Judas Maccabeus, there being no proper person left in the temple to offer it up. Titus caused the factious to be severely upbraided for it; exhorted John to set up whom he would to perform that office, rather than suffer the service of God to be set aside; and then challenged him and his party to come out of the temple, and fight on a more proper ground, and thereby save that sacred edifice from the fury of the Roman troops. When nothing could prevail on them, they began to set fire again to the gallery which yielded a communication between the temple and the castle Antonia. The Jews had already burnt about 20 cubits of it in length; but this second blaze, which was likewise encouraged by the besieged, consumed about 14 more; after which, they beat down what remained standing. On the 27th of July, the Jews, having filled part of the western portico with combustible matter, made a kind of flight; upon which, some of the forwardest of the Romans having scaled up to the top, the Jews set fire to it, which flamed with such sudden fury, that many of the former were consumed in it, and the rest, venturing to jump down from the battlements, were, all but one, crushed to death.

On the very next day, Titus having set fire to the north gallery, which inclosed the outer court of the temple, from fort Antonia to the valley of Cedron, got an easy admittance into it, and forced the besieged into that of the priests. He tried in vain six days to batter down one of the galleries of that precinct with an helepolis: he was forced to mount his battering-rams on the terrace, which was raised by this time; and yet the strength of this wall was such, that it eluded the force of these also, tho' others of his troops were busy in sapping it. When they found that neither rams nor sapping could gain ground, they betought themselves of scaling; but were vigorously repulsed in the attempt, with the loss of some standards, and a number of men. When Titus therefore found, that his desire of saving that building was like to cost so many lives, he set fire to the gates, which, being plated with silver, burnt all that night, whilst the metal dropt down in the melting. The flame soon communicated itself to the porticoes and galleries; which the besieged beheld without offering to stop it, but contented themselves with sending whole volleys of impotent curses against the Romans. This was done on the eighth of August; and, on the next day, Titus, having given orders to extinguish the fire, called a council, to determine whether the remainder of the temple should be saved or demolished. That general was still for the former, and most of the rest declared for the latter; alleging, that it was no longer a temple, but a scene of war and slaughter, and that the Jews would

Jews.

never be at rest as long as any part of it was left standing: but when they found Titus stiffly bent on preserving so noble an edifice, against which, he told them, he could have no quarrel, they all came over to his mind. The next day, August the 10th, was therefore determined for a general assault: and the night before the Jews made two desperate sallies on the Romans; in the last of which, the best, being timely succoured by Titus, beat them back into their inclosure.

But whether this last Jewish effort exasperated the besiegers, or, which is more likely, as Josephus thinks, pushed by the hand of Providence, one of the Roman soldiers, of his own accord, took up a blazing fire-brand, and, getting on his comrade's shoulders, threw it into one of the apartments that surrounded the sanctuary, thro' a window. This immediately set the whole north-side in a flame up to the third story, on the same fatal day and month in which it had been formerly burnt by Nebuchadnezzar. Titus, who was gone to rest himself a while in his pavilion, was awaked at the noise, and ran immediately to give orders to have the fire extinguished. He called, prayed, threatened, and even cased his men, but in vain; the confusion was so great, and the soldiers so obstinately bent upon destroying all that was left, that he was neither heard nor minded. Those that flocked thither from the camp, instead of obeying his orders, were busy, either in killing the Jews, or in increasing the flames. When Titus observed that all his endeavours were vain, he entered into the sanctuary and the most holy place, in which he found still such sumptuous utensils and other riches as even exceeded all that had been told him of it. Out of the former he saved the golden candlestick, the table of shew-bread, the altar of perfumes, all of pure gold, and the book or volume of the law, wrapped up in a rich gold tissue: but in the latter he found no utensils, because, in all probability, they had not made a fresh ark, since that of Solomon had been lost. Upon his coming out of that sacred place, some other soldiers set fire to it, and obliged those that had staid behind to come out; they all fell foul on the plunder of it, tearing even the gold plating off the gates and timber-work, and carried off all the costly utensils, robes, &c. they found, inasmuch that there was not one of them who did not enrich himself by it.

An horrid massacre followed soon after, in which a great many thousands perished; some by the flames, ⁴⁷ A dreadful massacre, others by the fall from the battlements, and a greater number by the enemy's sword, which destroyed all it met with, without distinction of age, sex, or quality. Among them were upwards of 6000 persons who had been seduced thither by a false prophet, who promised them, that they should find a speedy and miraculous relief there on that very day. Some of them remained five whole days on the top of the walls, and afterwards threw themselves on the general's mercy; but were answered that they had outstaid the time, and were led to execution. The Romans carried their fury to the burning of all the treasure-houses of the place, tho' they were full of the richest furniture, plate, vestments, and other things of value, which had been laid up in those places for security. In a word, they did not cease burning and butchering.

46
the gates
of the
temple set
a fire.

till they had destroyed all, except two of the temples, and that part of the court which was destined for the women.

In the mean time the seditious made such a vigorous push, that they escaped the fury of the Romans, at least for the present, and retired into the city. But here they found all the avenues so well guarded, that there was no possibility left for them to get out; which obliged them to secure themselves as well as they could on the south-side of it, from whence Simon, and John of Gischala, sent to desire a parley with Titus. They were answered, that though they had been the cause of all this bloodshed and ruin, yet they should have their lives spared, if they laid down their arms, and surrendered themselves prisoners. To this they replied, that they had engaged themselves, by the most solemn oaths, never to surrender; and therefore, only begged leave to retire into the mountains with their wives and children: which inference so exasperated the Roman general, that he caused an herald to bid them stand to their defence; for that not one of them should be spared, since they had rejected his last offers of pardon. Immediately after this, he abandoned the city to the fury of the soldiers, who fell forthwith on plundering, setting fire every where, and murdering all that fell into their hands; whilst the factious, who were left, went and fortified themselves in the royal palace, where they killed 8000 Jews, who had taken refuge there.

In the mean time, great preparations were making for a vigorous attack on the upper city, especially on the royal palace; and this took them up from the 20th of August to the 7th of September, during which time great numbers came and made their submission to Titus. The warlike engines then played so furiously on the factious, that they were taken with a sudden panic; and, instead of fleeing into the towers of Hippicos, Phafael, or Mariamne, which were yet untaken and so strong, that nothing but famine could have reduced them, they ran like madmen towards Siloah, with a design to have attacked the wall of circumvallation, and to have escaped out of the city; but, being there repulsed, they were forced to go and hide themselves in the public finks and common sewers, some one way and some another. All whom the Romans could find were put to the sword, and the city was set on fire. This was on the eighth of September, when the city was taken and entered by Titus. He would have put an end to the massacre; but his men killed all, except the most vigorous, whom they shut up in the porch of the women, just mentioned. Fronto, who had the care of them, reserved the youngest and most beautiful for Titus's triumph; and sent all that were above seventeen years of age into Egypt, to be employed in some public works there; and a great number of others were sent into several cities of Syria, and other provinces, to be exposed on the public theatres, to exhibit fights, or be devoured by wild beasts. The number of those prisoners amounted to 97,000, besides about 11,000 more, who were either starved thro' neglect, or starved themselves through fullness and despair.—The whole number of Jews who perished in this war is computed at upwards of 1,400,000.

Besides these, however, a vast number perished in

caves, woods, wildernesses, common-sewers, &c. of whom no computation could be made. Whilst the soldiers were still busy in burning the remains of the city, and visiting all the hiding-places, where they killed numbers of poor creatures who had endeavoured to evade their cruelty, the two grand rebels Simon and John were found, and referred for the triumph of the conqueror. John, being pinched with hunger, soon came out; and having begged his life, obtained it; but was condemned to perpetual imprisonment. Simon, whose retreat had been better stored, held out till the end of October. The two chiefs, with 700 of the handsomest Jewish captives, were made to attend the triumphal chariot; after which Simon was dragged through the streets with a rope about his neck, severely scourged, and then put to death; and John was sent into perpetual imprisonment.—Three castles still remained untaken, namely, Herodion, Machæron, and Massada. The two former capitulated; but Massada held out. The place was exceedingly strong both by nature and art, well stored with all kinds of provisions, and defended by a numerous garrison of zealots, at the head of whom was one Eleazar, the grandson of Judas Gaulonites, formerly mentioned. The Roman general having in vain tried his engines and battering-rams against it, bethought himself of surrounding it with a high and strong wall, and then ordered the gates to be set on fire. The wind pushed the flames so fiercely against the Jews, that Eleazar in despair persuaded them first to kill their wives and children, and then to choose ten men by lot, who should kill all the rest; and lastly one out of the surviving ten to dispatch them and himself; only this last man was ordered to set fire to the place before he put an end to his own life. All this was accordingly done; and on the morrow, when the Romans were preparing to scale the walls, they were greatly surprised neither to see nor hear any thing move. On this they made such an hideous outcry, that two women, who had concealed themselves in an aqueduct, came forth and acquainted them with the desperate catastrophe of the besieged.

Thus ended the Jewish nation and worship; nor have they ever since been able to regain the smallest footing in the country of Judea, nor indeed in any other country on earth, though there is scarce any part of the globe where they are not to be found. They continue their vain expectations of a Messiah to deliver them from the low estate into which they are fallen; and, notwithstanding their repeated disappointments, there are few who can ever be persuaded to embrace Christianity. Their ceremonies and religious worship ought to be taken from the law of Moses; but they have added a multitude of absurdities not worth the inquiring after. In many countries, and in different ages, they have been terribly massacred, and in general have been better treated by the Mahometans and Pagans than by Christians. Since the revival of arts and learning, however, they have felt the benefit of that increase of humanity which hath taken place almost all over the globe. It is said, that in this country the life of a Jew was formerly at the disposal of the chief lord where they lived, and likewise all his goods. Now, however, the case is altered, and they enjoy the protection of government. A Jew may

may be a witness by our law, being sworn on the Old Testament, and taking the oaths of allegiance.

Jew's Ears, in botany. See **TREMELLA**.

JEZIDES, among the Mahometans; a term of familiar import with heretics among Christians.

The Jezides are a numerous sect inhabiting Turkey and Persia, so called from their head Jezid, an Arabian prince, who slew the sons of Ali, Mahomet's father-in-law; for which reason he is reckoned a parricide, and his followers heretics. There are about 20,000 Jezides in Turkey and Persia; who are of two sorts, black and white. The white are clad like Turks; and distinguished only by their shirts, which are not slit at the neck like those of others, but have only a round hole to thrust their heads through. This is in memory of a golden ring, or circle of light, which descended from heaven upon the neck of their cheq, the head of their religion, after his undergoing a fast of forty days. The black Jezides, though married, are the monks or religious of the order; and these are called *Fakirs*.

The Turks exact excessive taxes from the Jezides, who hate the Turks as their mortal enemies; and when, in their wrath, they curse any creature, they call it *mussulman*: but they are great lovers of the Christians, being more fond of Jesus Christ than of Mahomet, and are never circumcised but when they are forced to it. They are extremely ignorant, and believe both the bible and the koran without reading either of them: they make vows and pilgrimages, but have no places of religious worship.

All the adoration they pay to God consists of some fogs in honour of Jesus Christ, the virgin, Moses, and sometimes Mahomet; and it is a principal point of their religion never to speak ill of the devil, lest he should resent the injury, if ever he should come to be in favour with God again, which they think possible; whenever they speak of him, they call him the *angel Peacock*. They bury their dead in the first place they come at, rejoicing as at a festival, and celebrating the entry of the deceased into heaven. They go in companies like the Arabians, and change their habitations every fifteen days. When they get wine, they drink it to excess; and it is said, that they sometimes do this with a religious purpose, calling it the blood of Christ. They buy their wives; and the market-price is two hundred crowns for all women, handsome or not, without distinction.

JEZRAEL, or **JEZREEL**, a town in the north of Samaria, towards mount Carmel, where stood a palace of the kings of Israel, 1 Kings xxi. 18. On the borders of Galilee (Joshua xix.) said to be one of the towns of Issachar.—The valley of Jezreel (Judges vi. 17.) was situated to the north of the town, running from west to east for ten miles; between two mountains; the one to the north, commonly called *Hermom*, near mount Tabor; the other *Gilboa*: in breadth two miles.

It, an island of France, in Provence, and the most eastern of the three before the harbour of Marseilles. It is very well fortified, and its port one of the best in the Mediterranean.

IGIS, a town of the country of the Grisons, in Caddes, with a magnificent castle, in which is a cabinet of curiosities, and a handsome library; 23 miles

south-west of Chorra; and 23 south of Glaris. E. lon. 9. o. N. lat. 49. 10.

Iglaw,
Ignatius.

IGLAW, a considerable and populous town of Germany, in Moravia, where they have a manufactory of good cloth, and excellent beer. It is seated on the river Iglau, 40 miles west of Brin, and 80 south-east of Prague. E. long. 15. 5. N. lat. 49. 10.

IGNATIUS LOYOLA, (canonized), the founder of the well-known order of the **JESUITS**, was born at the castle of Loyola, in Biscay, 1491; and became first page to Ferdinand V. king of Spain, and then an officer in his army. In this last capacity, he glorified himself by his valour; and was wounded in both legs at the siege of Pompeluna, in 1521. To this circumstance the Jesuits owe their origin; for, while he was under cure of his wound, a *Life of the saints* was put into his hands, which determined him to forsake the military for the ecclesiastical profession. His first devout exercise was to dedicate himself to the blessed virgin as her knight: he then went a pilgrimage to the Holy Land; and on his return to Europe, he continued his theological studies in the universities of Spain, though he was then 33 years of age. After this he went to Paris; and in France laid the foundation of this new order, the institutes of which he presented to Pope Paul III. who made many objections to them, but at last confirmed the institution in 1540. The founder died in 1555, and left his disciples two famous books; 1. *Spiritual exercises*; 2. *Constitutions or rules of the order*. But it must be remembered, that though these avowed institutes contain many privileges obnoxious to the welfare of society, the most diabolical are contained in the private rules intitled *Monita secreta*, which were not discovered till towards the close of the last century; and most writers attribute these, and even the constitutions, to Laynez, the second general of the order.

IGNATIUS (St), surnamed *Theophrastus*, one of the apostolical fathers of the church, was born in Syria, and educated under the apostle and evangelist St John, and intimately acquainted with some other of the apostles, especially St Peter and St Paul. Being fully instructed in the doctrines of Christianity, he was, for his eminent parts and piety, ordained by St John, and confirmed, about the year 67, bishop of Antioch, by those two apostles, who first planted Christianity in that city, where the disciples also were first called *Christians*. Antioch was then not only the metropolis of Syria, but a city the most famous and renowned of any in the east, and the ancient seat of the Roman emperors, as well as of their viceroys and governors. In this important seat he continued to sit somewhat above 40 years, both an honour and safeguard of the Christian religion, till the year 107, when Trajan the emperor, flushed with a victory which he had lately obtained over the Scythians and Daci, about the ninth year of his reign, came to Antioch to make preparations for a war against the Parthians and Armenians. He entered the city with the pomp and solemnities of a triumph; and, as his first care usually was about the concerns of religion, he began presently to inquire into that affair. Christianity had by this time made such a progress, that the Romans grew jealous and uneasy at it. This prince, therefore, had already commenced a persecution against the Christi-

ans in other parts of the empire, which he now resolved to carry on here. However, as he was naturally of a mild disposition, tho' he ordered the laws to be put in force against them if convicted, yet he forbade them to be fought after.

In this state of affairs, Ignatius, thinking it more prudent to go himself than stay to be sent for, of his own accord presented himself to the emperor, and, it is said, there passed a long and particular discourse between them, wherein the emperor expressing a surprize how he dared to transgress the laws, the bishop took the opportunity to assert his own innocence, and to explain and vindicate his faith with freedom. The issue of this was, that he was cast into prison, and this sentence passed upon him. That, being incurably over-run with superstition, he should be carried bound by soldiers to Rome, and there thrown as a prey to wild beasts.

He was first conducted to Seleucia, a port of Syria, at about 16 miles distance, the place where Paul and Barnabas set sail for Cyprus. Arriving at Smyrna in Ionia, he went to visit Polycarp bishop of that place, and was himself visited by the clergy of the Asian churches round the country. In return for that kindness, he wrote letters to several churches, as the Ephesians, Magnesians, and Trallians, besides the Romans, for their instruction and establishment in the faith; one of these was addressed to the Christians at Rome, to acquaint them with his present state, and passionate desire not to be hindered in that course of martyrdom which he was now hastening to accomplish.

His guard, a little impatient of their stay, set sail with him for Troas, a noted city of the lesser Phrygia, not far from the ruins of old Troy; where, at his arrival, he was much refreshed with the news he received of the persecution ceasing in the church of Antioch: hither also several churches sent their messengers to pay their respects to him; and hence too he dispatched two epistles, one to the church of Philadelphia, and the other to that of Smyrna; and, together with this last, as Eusebins relates, he wrote privately to Polycarp, recommending to him the care and inspection of the church of Antioch.

From Troas they sailed to Neapolis, a maritime town in Macedonia; thence to Philippi, a Roman colony, where they were entertained with all imaginable kindness and courtesy, and conducted forwards on their journey, passing on foot through Macedonia and Epirus, till they came to Epidaurium, a city of Dalmatia; where again taking shipping, they sailed through the Adriatic, and arrived at Rhegium, a port-town in Italy; directing their course thence through the Tyrrhenian sea to Putcoli, whence Ignatius desired to proceed by land, ambitious to trace the same way by which St Paul went to Rome: but this wish was not complied with; and, after a stay of 24 hours, a prosperous wind quickly carried them to the Roman port, the great harbour and station for their navy, built near Ostia, at the mouth of the Tyber, about 16 miles from Rome; whither the martyr longed to come, as much desirous to be at the end of his race, as his keepers, weary of their voyage, were to be at the end of their journey.

The Christians at Rome, daily expecting his arrival, were come out to meet and entertain him, and

accordingly received him with a mixture of joy and sorrow; but when some of them intimated, that possibly the populace might be taken off from desiring his death, he expressed a pious indignation, entreating them to cast no rubs in his way, nor do any thing that might hinder him, now he was hastening to his crown. There are many such expressions as this in his epistle to the Romans, which plainly shew that he was highly ambitious of the crown of martyrdom. Yet it does not appear that he rashly fought or provoked danger. Among other expressions of his ardor for suffering, he said, that the wild beasts had feared and refused to touch some that had been thrown to them, which he hoped would not happen to him. Being conducted to Rome, he was presented to the prefect, and the emperor's letters probably delivered concerning him. The interval before his martyrdom was spent in prayers for the peace and prosperity of the church. That his punishment might be the more pompous and public, one of their solemn festivals, the time of their Saturnalia, and that part of it when they celebrated their Sigillaria, was pitched on for his execution; at which time it was their custom to entertain the people with the bloody conflicts of gladiators, and the hunting and fighting with wild beasts. Accordingly, on the 13th kal. January, i. e. December 20. he was brought out into the amphitheatre, and the lions being let loose upon him, quickly dispatched their meal, leaving nothing but a few of the hardest of his bones. These remains were gathered up by two deacons who had been the companions of his journey; and being transported to Antioch, were interred in the cemetery, without the gate that leads to Daphne; whence, by the command of the emperor Theodosius, they were removed with great pomp and solemnity to the Tycheon, a temple within the city, dedicated to the public genius of it, but now consecrated to the memory of the martyr.

St Ignatius stands at the head of those Antient fathers, who have occasionally delivered their opinions in defence of the true divinity of Christ, whom he calls the *Son of God, and his eternal Word*. He is also reckoned the great champion of the doctrine of the episcopal order, as distinct and superior to that of priest and deacon. And one, the most important, use of his writings respects the authenticity of the holy Scriptures, which he frequently alludes to, in the very expressions as they stand at this day.—Archbishop Usher's edition of his works printed in 1647, is thought the best; yet there is a fresher edition extant at Amsterdam, where, beside the best notes, there are the dissertations of Usher and Pearson.

St IGNATIUS' *Bean*, the seed of a fruit of the gourd kind. The best account of the plant that has yet appeared, is that sent by father Camelli to Ray and Peltiver, and published in the philosophical transactions for the year 1699: he observes, that it grows in the Philippine islands, and winds itself about the tallest trees to the top; that it has large, ribbed, bitter leaves, a flower like that of the pomegranate, and a fruit larger than a melon. Some resemble the fruit to a pomegranate, probably from misapplying Camelli's words. The fruit is covered with a thin, glossy, blackish, green, and as it were marbled-shell, under which is lodged

gnatus
ignition.

loded another of a stony hardness: within this is contained a soft, yellow, bitterish pulp, in which lie the seeds or beans, to the number commonly of 24, each covered with a silvery down.

The same gentleman gives an account of the virtues attributed to these seeds by the Indians; but experience has shewn that they are dangerous. König relates, that a person, by drinking some of a spirituous tincture of them instead of aqua vitæ, was thrown into strong convulsions; and Dr Grim, that a dram of the seed in substance occasioned, for a time, a total deprivation of the senses. Others mention violent vomitings and purgings from its use. Neumann hath observed intermitting fevers removed by drinking, on the approach of a paroxysm, an infusion of some grains of the bean made in carduus water: We are not, however from hence to look upon this medicine as a universal febrifuge, or to use it indiscriminately.

These beans (for so custom requires that we should call them) are about the size of a moderately large nutmeg; in figure somewhat roundish, but extremely irregular, scarcely any two being entirely alike, full of unequal depressions and prominences; in colour, externally yellowish brown, but when the outer skin is taken off, of a blackish brown, and in part quite blackish; in consistence hard and compact as horn, so as not to be reducible into a powdery form but by cutting or rasping: for all their hardness, however, they are not proof against worms. When fresh, they have somewhat of a musky smell, which by age is lost: their taste is very bitter, resembled by some to that of centauria.

Four drams of these beans, boiled in water, gave just two drams of gummy extract; after which, rectified spirit of wine scarcely took up half a grain. Half an ounce, treated first with spirit, gave two scruples and a half of a gummy one. The spirituous extract made at first is of a yellowish colour, and the watery greenish. They are both bitter: the spirituous impresses at first a very agreeable bitterness, somewhat like that of peach-kernels; which going off, leaves in the month a strong bitter. The distilled liquors have no taste or smell.

IGNAVUS, the SLOTH, in zoology. See BRADYPUS.

IGNIS-FATUUS, a kind of light, supposed to be of an electric nature, appearing frequently in mines, marshy places, and near stagnating waters. It was formerly thought, and is still by the superstitious believed, to have something ominous in its nature, and to preface death and other misfortunes. There have been instances of people being decoyed by these lights into marshy places, where they have perished; whence the names of *Ignis-fatuus*, *Will-with-a-wisp*, and *Jack-with-a-lantern*, as if this appearance was an evil spirit which took delight in doing mischief of that kind. For a further account of the nature and properties of the *ignis-fatuus*, see the articles LIGHT and METEOR.

IGNITION, properly signifies the setting fire to any substance; but the sense is commonly restrained to that kind of burning which is not accompanied with flame, such as that of charcoal, cinders, metals, stones, and other solid substances.

The effects of ignition are first to dissipate what is called the *phlogiston* of the ignited substance, after

which it is reduced to ashes. Vitrification next follows; and lastly, the substance is totally dissipated in vapour. All these effects, however, depend on the presence of the air; for *in vacuo* the phlogiston of any substance cannot be dissipated. Neither can a body which is totally destitute of phlogiston be ignited in such a manner as those which are not deprived of it: for as long as the phlogiston remains, the heat is kept up in the body by the action of the external air upon it; but when the phlogiston is totally gone, the air always destroys, instead of augmenting the heat. Philosophers have therefore been greatly embarrassed in explaining the phenomena of ignition. It hath been found a matter of no small difficulty to determine how far the air, and how far the phlogiston, is concerned in this operation; but as these inquiries cannot be entered into without first determining the nature of the PHLOGISTON, we must refer to that article for an account of the different theories of ignition.

IGNORAMUS, in English law, a phrase which signifies "We are ignorant." This is used, when the grand jury impanelled on the inquisition of criminal causes reject the evidence as too weak to make good the presentment or indictment brought against a person, so as to bring him upon his trial by a petty jury; in which case they indorse this word on the back of the bill of indictment. In consequence of this, all further proceedings against the party accused are stopped, and the supposed offender is delivered without further answer.

IGNORANCE, the privation or absence of knowledge. The causes of ignorance, according to Locke, are chiefly these three. 1. Want of ideas. 2. Want of a discoverable connection between the ideas we have. 3. Want of tracing and examining our ideas. See METAPHYSICS, n^o 195—205.

IGNORANCE, or mistake, in law, a defect of will, whereby a person is excused from the guilt of a crime, when, intending to do a lawful act, he does that which is unlawful. For here the deed and the will acting separately, there is not that conjunction between them which is necessary to form a criminal act. But this must be an ignorance or mistake of fact, and not an error in point of law. As if a man intending to kill a thief or house-breaker in his own house, by mistake kills one of his own family, this is no criminal action: but if a man thinks he has a right to kill a person excommunicated or outlawed wherever he meets him, and does so; this is wilful murder. For a mistake in point of law, which every person of discretion not only may, but is bound and presumed to know, is, in criminal cases, no sort of defence. *Ignorantia juris quod quisque tenetur scire, neminem excusat*, is as well the maxim of our own law as it was of the Roman.

IGUANA, in zoology, a species of LACERTA.

IHOR, JOHOR, or Jor, a town of Asia, in Malacca, and capital of a province of the same name in the peninsula beyond the Ganges. It was taken by the Portuguese in 1603, who destroyed it, and carried off the cannon; but it has since been rebuilt, and is now in possession of the Dutch. E. Long. 3^o. 55. N. Lat. 1. 15.

JIB, the foremost sail of a ship, being a large stay-sail extended from the outer end of the bowsprit prolonged by the jib-boom, towards the fore-top-mast-head

Ignoramus
jib.

Jib. head. See SAIL.

The jib is a bit of great command with any side-wind, but especially when the ship is *close-hauled*, or has the wind upon her beam; and its effort in *casting* the ship, or turning her head to leeward, is very powerful, and of great utility, particularly when the ship is working through a narrow channel.

Jib-Boom. a boom run out from the extremity of the bowsprit, parallel to its length, and serving to extend the bottom of the jib, and the stay of the fore-top-gallant mast. This boom, which is nothing more than a continuation of the bowsprit forward, to which it may be considered as a top-mast, is usually attached to the bowsprit by means of two large boom-irons, or by one boom-iron, and a cap on the outer end of the bowsprit; or, finally, by the cap without, and a strong lashing within, instead of a boom-iron, which is generally the method of securing it in small merchant-ships. It may therefore be drawn in upon the bowsprit as occasion requires; which is usually practised when the ship enters a harbour, where it might very soon be broke or carried away, by the vessels which are moored therein, or passing by under sail.

JIG. See MUSIC, n° 252.

JIN. See GENII.

IKENILD STREET, one of the four famous ways which the Romans made in England, called *Stratum Icenorum*, because it began in the country of the *Iceni*, who inhabited Norfolk, Suffolk, and Cambridgeshire.

ILA, or **ISLA**, one of the western isles of Scotland, lying to the west of Jura, from which it is separated by a narrow channel. It extends 24 miles in length from north to south, and is 18 in breadth from east to west. On the east side, it is full of mountains covered with heath; to the southward, the land is tolerably well cultivated. In some parts the inhabitants have found great plenty of limestone, and lead-mines are worked in three different places. The only harbour in Isla is at Lochdale, near the north end of the island. Here are several rivers and lakes well stored with trout, eels, and salmon. In the centre is Loch Finlagan, about three miles in circuit, with the little isle of that name in the middle. Here the great Macdonald, lord of the isles, once resided in all the pomp of royalty; but his palaces and offices are now in ruins. Here he held his supreme court of judicature, consisting of fourteen judges, to which there was an appeal from all the lesser tribunals. Instead of a throne, Macdonald stood on a stone seven feet square, in which there was an impression made to receive his feet; here he was crowned and anointed by the bishop of Argyle and seven inferior priests, in presence of the chieftains, to whom he took a solemn oath, importing, that he would maintain their rights and possessions, and do justice to all his vassals. There are several forts built on the isles in fresh-water lakes, and divers caverns in different parts of the island, which have been used occasionally as places of strength. The air of Isla is not so salubrious as that of Jura, because it is more low and marshy; nevertheless, the people enjoy a good share of health: they are all Protestants, and have a variety of churches and chapels. The property of the island is at present vested in Campbell of Shawfield. On the coast of Isla are several small isles, such as Texa, Ouerfa, and Nave; nay, the natives

pretend that there is an island four miles in length about 30 leagues to the south-west of Isla. They say, it was discovered by the master of an English ship, who found it a low flat, covered with long grafs, and watered by a river, on the east side of which he saw great heaps of fish bones. A great number of seals lay basking on the rocks, and the cliffs were covered with sea-fowl. Finding many planks and boards which the sea had cast on the shore, he ordered his men to raise a pile about two stories, as a land-mark for mariners. After his departure, the inhabitants of Collonay, in fair weather, discerned from the top of an eminence an object which they supposed to be land; which, however, vanished, by next winter, when in all probability the pile was blown down by a storm.

ILCHESTER, a town of Somersetshire in England, seated on the river Yeovil. It is a place of great antiquity, as appears by the Roman coins which are sometimes dug up. It once had 16 churches, but now has only two. It is a corporation, and sends two members to parliament; here the county-gaol is kept. W. Long. 2. 45. N. Lat. 51. 5.

ILERDA, (anc. geog.) the capital of the Illegertes; situated on an eminence between the rivers Sicoris and Cinga; an unhappy city, often besieged, and often taken, because lying exposed to the incursions from Gaul; and under Gallienus it was destroyed by the Germans. Now **LERIDA**, in Catalonia, on the river Segra.

ILEX, the **HOLM**, or **Holly-tree**, a genus of the tetragynia order, belonging to the tetrandria class of plants.

There are several species of this genus; but the most remarkable is the aquifolium, or common holly. Of this there are a great number of varieties with variegated leaves, which are propagated by the nursery-gardeners for sale, and some years past were in very great esteem, but at present are but little regarded, the old taste of filling gardens with thorn evergreens being pretty well abolished; however, in the disposition of clumps, or rather plantations, of evergreen trees and shrubs, a few of the most lively colours may be admitted, which will have a good effect in the winter-season, if they are properly disposed.

The best of these varieties are the painted lady holly, British holly, Bradley's best holly, phyllis or cream-holly, milkmaid holly, Pritchett's best holly, gold-edged hedgehog holly, Cheyne's holly, glory-of-the-west holly, Broaderick's holly, Partridge's holly, Herefordshire white holly, Blind's cream holly, Longstaff's holly, Eales's holly, silver-edged hedgehog holly. All these variegates are propagated by budding or grafting them upon stocks of the common green holly: there is also a variety of the common holly with smooth leaves; but this is frequently found intermixed with the prickly-leaved on the same tree, and often on the same branch there are both sorts of leaves.

The common holly grows naturally in woods and forests in many parts of England, where it rises from 20 to 30 feet high, and sometimes more, but their ordinary height is not above 25 feet: the stem by age becomes large, and is covered with a greyish smooth bark; and those trees which are not lopped or browsed by cattle, are commonly furnished with branches the greatest part of their length, so form a sort of cone; the branches

Ilchester.

Illex.

the branches are garnished with oblong oval leaves, of a lucid green on their upper surface, but are pale on their under, having a strong midrib: the edges are indented and waved, with sharp thorns terminating each of the points, so that some of the thorns are raised upward, and others are bent downward, and being very stiff they are troublesome to handle. The leaves are placed alternate on every side of the branches; and from the base of their footstalks come out the flowers in clusters, standing on very short footstalks; each of these sustain five, six, or more flowers. They are of a dirty white, and appear in May; but are succeeded by roundish berries, which turn to a beautiful red about Michaelmas, and continue on the trees, if they are not destroyed, till after Christmas.

The common holly is a very beautiful tree in winter; therefore deserves a place in all plantations of evergreen trees and shrubs, where its shining leaves and red berries make a fine variety; and if a few of the best variegated kinds are properly intermixed, they will enliven the scene. It is propagated by seeds, which never come up the first year, but lie in the ground as the haws do; therefore the berries should be buried in the ground one year, and then taken up and sown at Michaelmas, upon a bed exposed only to the morning sun; the following spring the plants will appear, which must be kept clean from weeds; and if the spring should prove dry, it will be of great service to the plants if they are watered once a week; but they must not have it oftener, nor in too great quantity, for too much moisture is very injurious to these plants when young. In this feed-bed the plants may remain two years; and then should be transplanted in the autumn, into beds at about six inches asunder, where they may stand two years longer; during which time they must be constantly kept clean from weeds, and if the plants have thriven well, they will be strong enough to transplant where they are designed to remain: for when they are transplanted at that age, there will be less danger of their failing, and they will grow to a larger size than those which are removed when they are much larger; but if the ground is not ready to receive them at that time, they should be transplanted into a nursery in rows at two feet distance, and one foot asunder in the rows, in which place the plants may remain two years longer; and if they are designed to be grafted or budded with any of the variegated kinds, that should be performed after the plants have grown one year in the nursery: but the plants so budded or grafted should continue two years after in the nursery, that they may make good shoots before they are removed; though the plain ones should not stand longer than two years in the nursery, because when they are older they do not transplant so well. The best time for removing hollies is in the autumn, especially in dry land; but where the soil is cold and moist, they may be transplanted with great safety in the spring, if the plants are not too old, or have not stood long unremoved, for if they have, there is great doubt of their growing when removed.

Uses. Sheep in the winter are fed with croppings of holly. Birds eat the berries. The bark fermented and afterwards washed from the woody fibres, makes the common bird-lime. The plant makes an impenetrable fence, and bears cropping; however, it is not found in

all respects to answer for this purpose equally well with the hawthorn. The wood is used in finicering, and is sometimes stained black to imitate ebony. Handles for knives and cogs for mill-wheels are made of it. It is also made into hones for whetting of razors. Mr Miller says, he has seen the floor of a room laid with compartments of holly and mahogany, which had a very pretty effect.

ILFRACOMB, a town of Devonshire, seated on the Severn fea, almost opposite to Swansea in Glamorganshire, with a good harbour. W. Long. 4. 15. N. Lat. 51. 15.

ILIAD, the name of an ancient epic poem, the first and finest of those composed by Homer.

The poet's design in the Iliad was to shew the Greeks, who were divided into several little states, how much it was their interest to preserve a harmony and good understanding among themselves: for which end he sets before them the calamities that befel their ancestors from the wrath of Achilles; and his misunderstanding with Agamemnon; and the advantages that afterwards accrued to them from their union. The Iliad is divided into 24 books or rhapsodies, which are marked with the letters of the alphabet.

ILIUM, LIOS, or *Ilios*, (anc. geog.) a name for the city of Troy, but most commonly used by the poets, and distinguished by the epithet *Vetus*; at a greater distance from the sea than what was afterwards called *Ilium Novum*, and thought to be the *Iliumfluvii* Pagus of Strabo. New or modern Ilium was a village nearer the sea, with a temple of Minerva; where Alexander, after the battle of Granicus, offered gifts, and called it a city, which he ordered to be enlarged. His orders were executed by Lyfimachus, who encompassed it with a wall of 40 stadia. It was afterwards adorned by the Romans, who granted it immunities as to their mother-city. From this city the *Iliad* of Homer takes its name, containing an account of the war carried on between the Greeks and Trojans on account of the rape of Helen; a variety of disasters being the consequence, gave rise to the proverb *Ilios Malorum*.

ILKUCH, a royal town of Poland, in the palatinate of Cracow, remarkable for its silver-mines mixed with lead. It is seated in a barren and mountainous country, in E. Long. 20. o. N. Lat. 50. 26.

ILLECEBRUM, in botany, a genus of the monogynia order, belonging to the pentandria class of plants. There are several species, of which the most remarkable are the paronychia and the capitatum. Both these have trailing stalks near two feet long, which spread on the ground, garnished with small leaves like those of knot-grass. The heads of the flowers come out from the joints of the stalks, having neat silvery bractea surrounding them, which make a pretty appearance. Their flowers appear in June, and there is generally a succession of them for at least two months; and when the autumn proves warm, they will ripen their seeds in October. They are propagated by seeds which should be sown in a bed of light earth in the beginning of April: the plants will come up in May, when they should be kept clean from weeds till they are fit to remove. Some should be planted in small pots, and the rest in a warm border, observing to water and shade them till they have taken new root.

These plants are sometimes killed in severe winters; for which reason it is directed to plant some of them in pots, that they may be sheltered during that season.

ILLINOIS, a people of North America. inhabiting a country lying near a large lake of the same name, (called also *Michigan*), formed by the river St. Laurence. The country is fertile; and the people plant Indian corn, on which they chiefly subsist. They are civil, active, lively, and robust; and are much less cruel in their dispositions than the other Indian nations. They are, however, said to be great libertines, and to marry a number of wives; but some of their villages have embraced Christianity.

ILLICIUM, a genus of the octagynia order, belonging to the dodecandria class of plants. There is only one species, viz. the anisatum, a native of the woods of China and Japan. It rises with an erect branched stem to the height of a cherry-tree; and is covered with an ash-coloured bark, under which is another bark that is green, fleshy, somewhat mucous, and of an aromatic taste, combined with a small degree of astringency. The wood is hard and brittle; the pith small in quantity, fungous, and of a green herbaceous colour. The leaves resemble those of laurel; the flowers, in some sort, those of narcissus. These last generally stand single, are of a pale white, and consist of 16 petals, which differ in their form. The extremity of the flower-stalk being continued into the *germen*, or seed-bud of the flower, forms eight conjoined capsules, or one deeply divided into eight parts. Of these capsules, some frequently decay; the rest inclose each a single seed, somewhat resembling that of palma christi, and which, when the hardish corticle that closely covers and involves it is broken, exhibits a kernel that is white, fleshy, soft, and of a vapid taste. The bonzes, or priests of China and Japan, infuse into the inhabitants a superstitious belief, that the gods are delighted with the presence of this tree. Hence, they generally place before their idols garlands and bundles made of the branches. A similar opinion the Bramins inculcate into the Indians, of the Malabar fig, or *ficus religiosa*. The bark of the anise-tree, reduced to powder, and equally burnt, the public watchmen in Japan, by a very curious contrivance described by Kempfer, render useful in the measuring of time during the darkness of the night. The same powder is frequently burnt in brazen vessels on the Japanese altars, as incense is in other countries, from a belief that the idols in whose honour the ceremony is performed are greatly refreshed with the agreeable fragrantcy of its odour. It is remarkable, that a branch of this tree being added to a decoction of the poisonous fish, termed by the Dutch *de opblaaser*, (a fish the most delicate, if the poisonous matter be first properly expelled), increases its noxious quality, and exasperates the poison to an astonishing degree of activity and power.

ILLUMINATING, a kind of miniature-painting much practised in Britain about the 12th and 13th centuries, and of which many curious specimens are still remaining, particularly in the Harleian collection. From this word is derived the modern one of *limning*. It was chiefly used as we use copperplates, in illustrating and adorning the bible and other books. This art was much practised by the clergy, and even by some in the highest stations in the church. "The fa-

mous Osmund (says Brompton), who was consecrated bishop of Salisbury A. D. 1076, did not disdain to spend some part of his time in writing, binding, and illuminating books." Mr Strutt hath given the public an opportunity of forming some judgment of the degree of delicacy and art with which these illuminations were executed, by publishing prints of a prodigious number of them, in his *Regal and ecclesiastical antiquities of England, and View of the customs, &c. of England*. In the first of these works we are presented with the genuine portraits, in miniature, of all the kings, and several of the queens, of England, from Edward the Confessor to Henry VII. mostly in their crowns and royal robes, together with the portraits of many other eminent persons of both sexes.

The illuminators and painters of this period seem to have been in possession of a considerable number of colouring materials, and to have known the arts of preparing and mixing them, so as to form a great variety of colours. In the specimens of their miniature-paintings that are still extant, we perceive not only the five primary colours, but also various combinations of them. There is even some appearance, that they were not ignorant of the art of painting in oil, from the following precept of Henry III. "Pay out of our treasury, to Odo the goldsmith, and Edward his son, one hundred and seventeen shillings and ten pence, for oil, varnish, and colours bought, and pictures made, in the chamber of our queen at Westminster, between the octaves of the Holy Trinity, in the twenty-third year of our reign, and the feast of St Barnabas the apostle, in the same year, which is fifteen days." This was a considerable sum (equal in quantity of silver to 17 pounds 14 shillings of our money, and in efficacy to 88 pounds) to be expended in painting one chamber in so short a time.

ILLYRICA, (anc. geog.) a country extending from the Adriatic to Pannonia. Its boundaries are variously assigned. Pliny makes it extend in length from the river Arsa to the Drinius, thus including Liburnia to the west, and Dalmatia to the east; which is also the opinion of Ptolemy, who settles its limits from mount Scardus and the Upper Mæsia on the east to Istria in the west. The country is now called *Sclavonia*.

ILLYRIUS, (Matthias, Flaccus, or Francowitz), one of the most learned divines of the Augsburg confession, born in Istria, anciently called *Illyria*, in 1520. He is said to have been a man of vast genius, extensive learning, of great zeal against Popery; but of such a restless and passionate temper, as overbalanced all his good qualities, and occasioned much disturbance in the Protestant church. He published a great number of books, and died in 1575.

IMAGE, in a religious sense, is an artificial representation or similitude of some person or thing, used either by way of decoration and ornament, or as an object of religious worship and adoration; in which last sense, it is used indifferently with the word *Idol*.

IMAGE, in optics, a figure in the form of any object, made by the rays of light issuing from the several points of it, and meeting in so many other points, either at the bottom of the eye, or on any other ground, or in any transparent medium, where there is no surface to reflect them. Thus we are said to see all objects

jects by means of their images formed in the eye.

IMAGINATION, a power or faculty of the mind, whereby it conceives and forms ideas of things communicated to it by the outward organs of sense. See METAPHYSICS; and MORALS, n° 184.

Force of IMAGINATION. See MONSTER.

IMAN, a name applied by the Mahometans to him who is head of the congregations in their mosques; and, by way of eminence, to him who has the supreme authority both in respect to spirituals and temporals.

IMMAUS, (anc. geog.), the largest mountain of Asia, (Strabo); and a part of Taurus, (Vast); from which the whole of India runs off into a vast plain, resembling Egypt. It extends far and wide through Scythia, as far as to the Mare Glaciale, dividing it into the Hither or *Scythia intra Immaum*, and into the Farther or *Scythia extra Immaum*, (Ptolemy); and also stretching out along the north of India to the eastern ocean, separates it from Scythia. It had various names according to the different countries it ran through: Ptolemy thinks it is the *Sephar* of Scripture.

IMBECILITY, a languid, infirm state of body, which, being greatly impaired, is not able to perform its usual exercises and functions.

IMBIING, the action of a dry porous body, that absorbs or takes up a moist or fluid one: thus, sugar imbibes water; a sponge, the moisture of the air, &c.

IMBRICATED, among botanists. See BORANY, p. 1298, n° 142.

IMITATION, derived from the Latin *imitare*, to represent, or repeat, a sound or action, either exactly, or nearly in the same manner, as they were originally exhibited.

IMITATION, in music, admits of two different senses. Sound and motion are either capable of imitating themselves by a repetition of their own particular modes; or of imitating other objects of a nobler and more abstracted nature. Nothing perhaps is so purely mental, nothing so remote from external sense, as not to be imitable by music. But as the description of this in M. Rousseau, article *Imitation*, is nobly animated, and comprehends all that is necessary to be said on the subject, we translate it as follows.

“Dramatic or theatrical music (says he), contributes to imitation no less than painting or poetry: it is in this common principle that we must investigate both the origin and the final cause of all the fine arts; as M. le Batteux has shown †. But this imitation is not equally extensive in all the imitative arts. Whatever the imagination can represent to itself is in the department of poetry. Painting, which does not present its pictures to the imagination immediately, but to external sense and to one sense alone, paints only such objects as are discoverable by sight. Music might appear subjected to the same limits with respect to the ear; yet it is capable of painting every thing, even such images as are objects of ocular perception alone: by a magic almost inconceivable, it seems to transform the ears into eyes, and endow them with the double function of perceiving visible objects, by the mediums of their own; and it is the greatest miracle of an art, which can only act by motion, that it can make that

very motion represent absolute quiescence. Night, sleep, silence, solitude, are the noble efforts, the grand images, represented by a picturesque music. We know that noise can produce the same effect with silence, and silence the same effect with noise; as when one sleeps at a lecture insidiously and monotonically delivered, but wakes the instant when it ends. But music acts more intimately upon our spirits, in exciting by one sense dispositions similar to those which we find excited by another; and, as the relation between these images cannot be sensible unless the impression be strong, painting, when divested of this energy, cannot restore to music that assistance in imitations which she borrows from it. Though all nature should be asleep, he who contemplates her does not sleep; and the art of the musician consists in substituting, for this image of insensibility in the object, those emotions which its presence excites in the heart of the contemplator. He not only ferments and agitates the ocean, animates the flame to conflagration, makes the fountain murmur in his harmony, calls the rattling shower from heaven, and swells the torrent to resistless rage; but he paints the horrors of a boundless and frightful desert, involves the subterranean dungeon in tenfold gloom, soothes the tempest, tranquillizes the disturbed elements, and from the orchestra diffuses a recent fragrance through imaginary groves; nay, he excites in the soul the same emotions which we feel from the immediate perception and full influence of these objects.”

Under the word *Harmony*, Rousseau has said, that no assistance can be drawn from thence, no original principle which leads to musical imitation; since there cannot be any relation between chords and the objects which the composer would paint, or the passions which he would express. In the article *Melody*, he imagines he has discovered that principle of imitation which harmony cannot yield, and what resources of nature are employed by music in representing these objects and these passions.

It is hoped, however, that, in our article of *Melody*, we have shown upon what principle musical imitation may be compatible with harmony; though we admit, that from melody it derives its most powerful energy, and its most attractive graces. Yet we must either be deceived beyond all possibility of cure, or we have felt the power of imitative harmony in a high degree. We are certain that the fury, the impetuosity, the rapid vicissitudes, of a battle, may be successfully and vividly represented in harmony. We have participated the exultation and triumph of a conquest, inspired by the sound of a full chorus. We have felt all the solemnity and grandeur of devotion from the slow movement, the deep chords, the swelling harmony, of a sentimental composition played upon the organ. Nor do we imagine harmony less capable of representing the tender depression, the fluctuating and tremulous agitation, of grief. As this kind of imitation is the noblest effort of music, it is astonishing that it should have been overlooked by M. D'Alembert. He has indeed apologized, by informing us, that his treatise is merely elementary: but we are uncertain how far this apology ought to be regarded as sufficient, when it is at the same time considered, that he has given an account of imitation in its mechanical, or what Rousseau calls its

Immaculate
||
Immunity.

technical, sense; which, however, to prevent ambiguity, we should rather choose to call *myself*, or *anacaphidist*. To Rousseau's account of the word in this acceptance, we return.

"Imitation (says he), in its technical sense, is a reiteration of the same air, or of one which is similar, in several parts where it is repeated by one after the other, either in unison, or at the distance of a fourth, a fifth, a third, or any other interval whatever. The imitation may be happily enough pursued even though several notes should be changed; provided the same air may always be recognized, and that the composer does not deviate from the laws of proper modulation. Frequently, in order to render the imitation more sensible, it is preceded by a general rest, or by long notes which seem to obliterate the impression formerly made by the air till it is renewed with greater force and vivacity by the commencement of the imitation. The imitation may be treated as the composer chooses; it may be abandoned, resumed, or another begun at pleasure; in a word, its rules are as much relaxed as those of the fugue are severe: for this reason, it is despised by the most eminent masters; and every imitation of this kind too much affected, almost always betrays a novice in composition."

IMMACULATE, something without stain, chiefly applied to the conception of the holy virgin. See CONCEPTION *Immaculate*.

IMMATERIAL, something devoid of matter, or that is pure spirit: thus God, angels, and the human soul, are immaterial beings.

IMMEDIATE, whatever is capable of producing an effect without the intervention of external means; thus we say, an immediate cause, in opposition to a mediate or remote one.

IMMENSITY, an unlimited extension, or which no finite and determinate space, repeated ever so often, can equal.

IMMER, the most easterly island of all the New Hebrides in the South Sea. It lies about four leagues from TANNA, and seems to be about five leagues in circumference; it is of a considerable height, with a flat-top.

IMMERSION, that act by which any thing is plunged into water or other fluid.

It is used in chemistry for a species of calcination, when any body is immersed in a fluid to be corroded: or it is a species of lotion; as when a substance is plunged into any fluid, in order to deprive it of a bad quality, or communicate to it a good one.

IMMERSION, in astronomy, is when a star or planet is so near the sun with regard to our observations, that we cannot see it; being, as it were, enveloped and hid in the rays of that luminary. It also denotes the beginning of an eclipse of the moon, or that moment when the moon begins to be darkened, and to enter into the shadow of the earth.

IMMORTAL, that which will last to all eternity, as having in it no principle of alteration or corruption: thus God and the human soul are immortal. See SOUL.

IMMUNITY, a privilege or exemption from some office, duty, or imposition, as an exemption from tolls, &c.

Immunity is more particularly understood of the liberties granted to cities and communities.

IMOLA, a town of Italy, in the territory of the church, and in Romagna, with a bishop's see. It is a very handsome populous place; and is seated on the river Santarno, in E. Long. 11. 43. N. Lat. 44. 28.

IMPALE, in heraldry, is to conjoin two coats of arms pale-wise. Women impale their coats of arms with those of their husbands. See HERALDRY, p. 3589, 3610.

To impale cities, camps, fortifications, &c. is to inclose them with palisadoes.

To **IMPALE**, or **Empale**, signifies also to put to death by spitting on a stake fixed upright.

IMPALPABLE, that whole parts are so extremely minute, that they cannot be distinguished by the senses, particularly by that of feeling.

IMPANATION, a term used by divines to signify the opinion of the Lutherans with regard to the eucharist, who believe that the species of bread and wine remain together with the body of our Saviour after consecration.

IMPANELLING, in law, signifies the writing down or entering into a parchment, list, or schedule, the names of a jury summoned by the sheriff to appear for such public services as juries are employed in.

IMPARLANCE, in law, a petition in court for a day to consider or advise what answer the defendant shall make to the plaintiff's action; and is the continuance of the cause till another day, or a longer time given by the court.

IMPASTATION, the mixture of various materials of different colours and consistencies, baked or bound together with some cement, and hardened either by the air or by fire.

IMPATIENS, TOUCH-ME-NOT, and *Balsamine*; a genus of the monogamia order, belonging to the syn-genefia class of plants.

Species. 1. The noli-me-tangere, or common yellow balsamine, is a native of Britain, but is cultivated in many gardens for curiosity. It hath a fibrous root, an upright, jointed, succulent, stalk, about 18 inches high, with alternate oval leaves; and from the axillas of the stalks, long, slender, branching footstalks, each sustaining many yellow flowers; succeeded by taper capsules, that burst open and dart forth their seeds with great velocity, whence its name. 2. The balsamina, or balsam, is a native of India. It hath a fibrous root, an upright, thick, succulent stalk, branching all around a foot and an half or two feet high; with long, spear-shaped, sawed leaves, the upper ones alternate; and from the joints of the stalk and branches clusters of short foot-stalks, each sustaining one large irregular flower, of different colours in the varieties; flowering from June or July till September.

Culture. The first species is very hardy, and will grow freely from the seeds in any common border; but the second requires artificial warmth. The seeds will indeed grow in the full ground, but rarely before the month of May; and more freely then, if covered with a hand-glass, &c. But the plants raised by artificial heat will flower five or six weeks sooner than those raised in the natural ground. The seeds ought therefore always to be sowed on a hotbed in March or April, and the plants continued therein till June, and if the frames be deep they will then be drawn up to the length of two or three feet; after which they may

Imola
||
Impatiens.

impeach-
ment
||
imperfect.

be planted in pots, which must likewise be continued in the hot-bed till the plants have taken fresh root.

IMPEACHMENT, an accusation and profecution for treason and other crimes and misdemeanours. Any member of the lower house of parliament may impeach any one belonging either to that body, or to the house of lords. The method of proceeding is to exhibit articles on the behalf of the commons, by whom managers are appointed to make good their charge. These articles are carried to the lords, by whom every person impeached by the commons is always tried; and if they find him guilty, no pardon under the great seal can be pleaded to such an impeachment. 12 Will. III. cap. ii.

IMPENETRABILITY, in philosophy, that property of body, whereby it cannot be pierced by another: thus, a body which fills a space as to exclude all others, is said to be impenetrable.

IMPERATIVE, one of the moods of a verb, used when we would command, intreat, or advise: thus, *go read, take pity, be advised*, are imperatives in our language. But in the learned languages, this mood has a peculiar termination to distinguish it from others, as *io, or ito, "go;" lege, or legito, "read," &c.* and not only so, but the termination varies, according as you address one or more persons, as *audi* and *audite*; ακούω, ακούετε, ακούστω, &c.

IMPERATOR, in Roman antiquity, a title of honour conferred on victorious generals by their armies, and afterwards confirmed by the senate.

IMPERATORIA, **MASTERWORT**; a genus of the digynia order, belonging to the pentandria class of plants.—There is but one species, viz. the ostruthium, a native of the Austrian and Styrian Alps, and other mountainous places of Italy. Mr Lightfoot also informs us, that he has found it in several places on the banks of the Clyde in Scotland; but whether indigenous or not, is uncertain. The root is as thick as a man's thumb, running obliquely in the ground; it is fleshy, aromatic, and has a strong acrid taste, biting the tongue like pellitory of Spain: the leaves arise immediately from the root; they have long foot-stalks, dividing into three very short ones at the top, each sustaining a trilobate leaf, indented on the border. The footstalks are deeply channelled, and, when broken, emit a rank odour. The flower-stalks rise about two feet high, dividing into two or three branches, each being terminated by a pretty large umbel of white flowers whose petals are split; these are succeeded by oval compressed seeds, somewhat like those of dill, but larger.—The plant is cultivated in gardens for the sake of its roots, which are used in medicine. It may be propagated either by seeds, or by parting the roots in autumn. They thrive best in a shady situation.—The root has a flavour similar to that of angelica, and is esteemed a good sudorific. There are instances of its having cured the ague when the bark had failed. It should be dug up in winter, and a strong infusion made in wine.

IMPERFECT, something that is defective, or that wants some of the properties found in other beings of the same kind.

IMPERFECT Tense, in grammar, a tense that denotes some preterite case, or denotes the thing to be at that time present and not quite finished; as *scri-*

bebam, "I was writing."

IMPERIAL, something belonging to an emperor, or empire. See **EMPEROR**, and **EMPIRE**.—Thus we say, his *imperial majesty, the imperial crown, imperial arms, &c.*

IMPERIAL Crown. See **HERALDRY**, p. 3606.

IMPERIAL Chamber, is a sovereign court, established for the affairs of the immediate states of the empire. See **CHAMBER**.

IMPERIAL Cities, in Germany, are those which own no other head but the emperor.

These are a kind of little commonwealths; the chief magistrate whereof does homage to the emperor, but in other respects, and in the administration of justice, is sovereign.

Imperial cities have a right of coining money, and of keeping forces and fortified places. Their deputies assist at the imperial diets, where they are divided into two branches, that of the Rhine, and that of Suabia. There were formerly 22 in the former, and 37 in the latter; but there are now only 48 in all.

IMPERIAL Diet, is an assembly or convention of all the states of the empire. See **DIET**.

IMPERIALI (John Baptist), a celebrated physician of Vicenza, where he was born in 1568. He composed several esteemed works both in prose and verse, written in good Latin; and died in 1623.

IMPERSONAL VERB, in grammar, a verb to which the nominative of any certain person cannot be prefixed; or, as others define it, a verb destitute of the two first and primary persons, as *deceit, oportet, &c.* The impersonal verbs of the active voice end in *t*, and those of the passive in *tur*; they are conjugated thro' the third person singular of almost all the tenses and moods: they want the imperative, instead of which we use the present of the subjunctive; as *punitur, pugnetur, &c.* nor, but a few excepted, are they to be met with in the supines, participles, or gerunds.

IMPERVIOUS, a thing not to be pervaded or passed through, either by reason of the closeness of its pores, or the particular configuration of its parts.

IMPETUS, in mechanics, the force with which one body strikes or impells another.

IMPLICATION, in law, is where something is implied that is not expressed by the parties themselves in their deeds, contracts, or agreements.

To IMPLY, or CARRY, in Music. These we have used as synonymous terms in that article. They are intended to signify those sounds, which ought to be the proper concomitants of any note, whether by its own nature, or by its position in artificial harmony. Thus every note, considered as an independent sound, may be said to *carry* or *imply* its natural harmonics, that is to say, its octave, its twelfth, and its seventeenth; or, when reduced, its eighth, its fifth, and its third. But the same sound when considered as constituting any part of harmony, is subjected to other laws and different limitations. It can then only be said to *carry* or *imply* such simple sounds, or complications of sound, as the preceding and subsequent chords admit or require. For these the laws of melody and harmony must be consulted. See **MELODY**, and **HARMONY**.

IMPORTATION in commerce, the bringing merchandize into a kingdom from foreign countries; in

Imperial
||
Importation.

Importation.

in contradistinction to exportation. See EXPORTATION.

We shall here give some of the principal laws relating to the importation of goods into this kingdom. Goods imported without entry or paying customs, are forfeited; and the lord-treasurer, the barons of the exchequer, or chief magistrates of the place where the offence was committed, or next adjoining to it, may grant a warrant to any person, who, with the assistance of a constable, may break open doors, chests, &c. and take thence any prohibited or unaccustomed goods; but this is to be done within one month after the offence was committed. But if false information is given, the person wrongfully accused may recover costs and damages.

No ship or vessel arriving from beyond sea is to be above three days in failing from Gravesend to the place of discharge on the river Thames, unless hindered by contrary winds or other impediment. And no ship bound for the port of London is to touch or stay at any place adjoining to any shore, between Gravesend and Chester-quay. True entries are to be made of all such ships lading, upon oath of the master or purser for that voyage; also where she took in her lading, where she was built, how manned, who were the owners, and who the master during the voyage. In all out-ports, ships are to come directly to the place of unlading, and make true entries as aforesaid, upon penalty of the forfeiture of 100 l.

After any ship is cleared, and the watchmen and tidemen discharged from their attendance, if there be found on board any concealed goods that have not paid the duty inwards, the master, or other person taking charge of the ship, shall forfeit 100 l.

Porters, carmen, watermen, &c. assisting in lading unaccustomed goods, shall on conviction, for the first offence, be committed to the next jail till they find security for their good behaviour; and for their second offence they are to be committed to prison for two months, without bail or mainprize, or till they are discharged by the court of exchequer, or each of them pay 5 l. to the sheriff of the county.

No merchant-denizen shall cover a stranger's goods, but shall, by himself or agent, sign one of his bills of every entry, with the mark, number, and contents of every parcel of goods, without which no entry shall pass. And no children of aliens under the age of 21 years, shall have entry made in their names, nor be permitted to trade.

Merchants, trading into the port of London, shall have free liberty to lade and unlade their goods at any of the lawful quays between the tower and London-bridge, from sun-rising to sun-setting, from September 10. to March 10.; and between six o'clock in the morning and six in the evening, from March 10. to September 10.; giving notice thereof to the respective officers appointed to attend the lading and unlading of goods. And such officers as shall refuse to be present shall forfeit 5 l. for every default.

To prevent combination between importers, and seizers of goods unlawfully imported or exported, none shall seize them but the officers of the customs, or such as shall be authorized so to do by the lord-treasurer, under-treasurer, or a special commission from his majesty under the great privy-seal.

If any feizer of prohibited or unaccustomed goods does not make due prosecution thereof, it is lawful for the custom-house officers, or others deputed thereto, to make seizure of such goods; and they shall be, in law, adjudged the first true informers and feizers, and have the benefit thereof, notwithstanding any law and statute to the contrary.

All foreign goods permitted to be landed by bills at sight, bills at view or sufferance, shall be landed at the most convenient quays and wharfs, as the officers of the customs shall direct; and there, or at the king's store-house of the respective ports, shall be measured, weighed, numbered, &c. by the officers appointed, who shall perfect the entry, and subscribe their names to it, and the next day make their report to the customer, collector, or comptroller; or, in default thereof, shall forfeit 100 l.

Any merchant who shall import goods, shall have liberty to break bulk in any lawful port or quay, the master or purser first making oath of the true contents of the ship's lading. No English merchant shall put on shore in Scotland or Ireland, any merchandize of the growth or produce of any of his majesty's plantations, unless the same have been first landed in England, Wales, or Berwick, and paid the duties with which they are chargeable, under the penalty of forfeiting the ship and goods, three-fourths to the king, and one-fourth to the informer or him that shall sue for the same: but if a ship be disabled, or driven into any port of Ireland, and unable to proceed on her voyage, her goods may be put on shore, under the hands of the principal officers of the customs there residing, till the goods can be put on board some other vessel, to be transported to some part of England or Wales.

Natives of England or Ireland may import into England, directly from Ireland, any hemp, flax, thread, yarn and linen, of the growth and manufacture of Ireland, custom-free; the chief officer so importing bringing a certificate from the chief office in Ireland, expressing the particulars of the goods, with the names and places of abode of the exporters thence, and of such as have sworn that the said goods are *bona fide* of the growth and manufacture of that kingdom, and who they are consigned to in England; and the chief officer shall make oath, that the said goods are the same that are on board by virtue of that certificate.

IMPOST, in law, signifies in general a tribute or custom, but is more particularly applied to signify that tax which the crown receives for merchandizes imported into any port or haven.

IMPOSTHUME, in surgery, &c. See ABSCESS.

IMPOTENCE, or IMPOTENCY, in general, denotes want of strength, power, or means, to perform any thing.

Divines and philosophers distinguish two sorts of impotency; natural, and moral. The first is a want of some physical principle, necessary to an action; or where a being is absolutely defective, or not free and at liberty to act: The second only imports a great difficulty; as a strong habit to the contrary, a violent passion, or the like.

Impotency is more particularly used for a natural inability to coition. Impotence with respect to men

Importation
||
Impotence.

impregnation is the same as sterility in women; that is, an inability of propagating the species. There are many causes of impotence; as, a natural defect in the organs of generation, which seldom admits of a cure: accidents, or diseases; and in such cases the impotence may, or may not, be remedied, according as these are curable or otherwise.—The most common causes are, early and immoderate venery, or the venereal disease. We have instances, however, of unfitness for generation in men by an impediment to the ejection of the semen in coition, from a wrong direction which the orifice at the *verumontanum* got, whereby the seed was thrown up into the bladder. M. Petit cured one patient under such a difficulty of emission, by making an incision like to that commonly made in the great operation for the stone.

IMPREGNATION, the getting a female with child. See PREGNANCY.

The term *impregnation* is also used, in pharmacy, for communicating the virtues of one medicine to another, whether by mixture, coction, digestion, &c.

IMPRESSING SEAMEN. The power of impressing sea-faring men for the sea-service by the king's commission, has been a matter of some dispute, and submitted to with great reluctance; though it hath very clearly and learnedly been shewn by Sir Michael Foster, that the practice of impressing, and granting powers to the admiralty for that purpose, is of very ancient date, and hath been uniformly continued by a regular series of precedents to the present time: whence he concludes it to be part of the common law. The difficulty arises from hence, that no statute has expressly declared this power to be in the crown, though many of them very strongly imply it. The statute 2 Ric. II. c. 4. speaks of mariners being arrested and retained for the king's service, as of a thing well known, and practised without dispute; and provides a remedy against their running away. By a later statute, if any waterman, who uses the river Thames, shall hide himself during the execution of any commission of pressing for the king's service, he is liable to heavy penalties. By another, (*5 Eliz. c. 5.*) no fisherman shall be taken by the queen's commission to serve as a mariner; but the commission shall be first brought to two justices of the peace, inhabiting near the sea-coast where the mariners are to be taken, to the intent that the justices may choose out and return such a number of able-bodied men, as in the commission are contained, to serve her majesty. And, by others, especial protections are allowed to seamen in particular circumstances, to prevent them from being impressed. Ferry-men are also said to be privileged from being impressed, at common law. All which do most evidently imply a power of impressing to reside somewhere; and, if any where, it must, from the spirit of our constitution, as well as from the frequent mention of the king's commission, reside in the crown alone.—After all, however, this method of manning the navy is to be considered as only defensible from public necessity, to which all private considerations must give way.

The following persons are exempted from being impressed: Apprentices for three years; the master, mate, and carpenter, and one man for every 100 tons, of vessels employed in the coal-trade; all under 18 years of age, and above 55; foreigners in merchant-ships

and privateers; landmen betaking themselves to sea for two years; seamen in the Greenland fishery, and harpooners, employed, during the interval of the fishing season, in the coal-trade, and giving security to go to the fishing next season.

IMPRESSION is applied to the species of objects which are supposed to make some mark or impression on the senses, the mind, and the memory. The Peripatetics assert, that bodies emit species resembling them, which are conveyed to the common *sensorium*, and they are rendered intelligible by the active intellect; and, when thus spiritualized, are called *expressions*, or *express species*, as being expressed from the others.

IMPRESSION also denotes the edition of a book, regarding the mechanical part only; whereas *edition*, besides this, takes in the care of the editor, who corrected or augmented the copy, adding notes, &c. to render the work more useful.

IMPRISONMENT, the state of a person restrained of his liberty, and detained under the custody of another.

No person is to be imprisoned but as the law directs, either by the command or order of a court of record, or by lawful warrant; or the king's process, on which one may be lawfully detained. And at common law, a person could not be imprisoned unless he were guilty of some force and violence, for which his body was subject to imprisonment, as one of the highest executions. Where the law gives power to imprison, in such case it is justifiable, provided he that does it in pursuance of a statute, exactly pursues the statute in the manner of doing it; for otherwise it will be deemed false imprisonment, and of consequence it is unjustifiable. Every warrant of commitment for imprisoning a person, ought to run, "Till delivered by due course of law," and not "Until farther order;" which has been held ill: and thus it also is, where one is imprisoned on a warrant not mentioning any cause for which he is committed. See ARREST and COMMITMENT.

False IMPRISONMENT. Every confinement of the person is an imprisonment, whether it be in a common prison, or in a private house, or in the stocks, or even by forcibly detaining one in the public streets. Unlawful or false imprisonment, consists in such confinement or detention without sufficient authority: which authority may arise either from some process from the courts of justice; or from some warrant from a legal power to commit, under his hand and seal, and expressing the cause of such commitment; or from some other special cause warranted, for the necessity of the thing, either by common law, or act of parliament; such as the arresting of a felon by a private person without warrant, the impressing of mariners for the public service, or the apprehending of waggoners for misbehaviour in the public highways. False imprisonment also may arise by executing a lawful warrant or process at an unlawful time, as on a Sunday; or in a place privileged from arrests, as in the verge of the king's court. This is the injury. The remedy is of two sorts; the one removing the injury, the other making satisfaction for it.

The means of removing the actual injury of false imprisonment, are four-fold, 1. By writ of MAINPRIZE. 2. By writ *De Odio et Atia*. 3. By writ *De Homine Replegiando*.

Impression
||
Imprisonment.

Impromptu *Replegiando*. 4. By writ of *HABEAS Corpus*. See those articles.

Impurity.

The *satisfactory* remedy for this injury of false imprisonment, is by an action of trespass *vi et armis*, usually called an *action of false imprisonment*; which is generally, and almost unavoidably, accompanied with a charge of assault and battery also: and therein the party shall recover damages for the injuries he has received; and also the defendant is, as for all other injuries committed with force, or *vi et armis*, liable to pay a fine to the king for the violation of the public peace.

IMPROMPTU, or **IMPROMPTU**, a Latin word frequently used among the French, and sometimes in English, to signify a piece made off-hand, or *extempore*, without any previous meditation, by mere force and vivacity of imagination.—Many authors pique themselves on their *impromptu's*, which yet were done at leisure and in cold blood.

IMPROBATION, in Scots law, the name of an action brought for setting any deed or writing aside upon the head of forgery.

IMPROPRIATION, in ecclesiastical law. See **APPROPRIATION**.

IMPURITY, in the law of Moses, is any legal defilement. Of these there were several sorts. Some were voluntary, as the touching a dead body, or any animal that died of itself, or any creature that was esteemed unclean; or the touching things holy, by one who was not clean, or was not a priest; the touching one who had a leprosy, one who had a gonorrhœa, or who was polluted by a dead carcase, &c. Sometimes these impurities were involuntary; as when any one inadvertently touched bones, or a sepulchre, or any thing polluted; or fell into such diseases as pollute, as the leprosy, &c.

The beds, clothes, and moveables, which had touched any thing unclean, contracted also a kind of impurity, and in some cases communicated it to others.

These legal pollutions were generally removed by bathing, and lasted no longer than the evening. The person polluted plunged over head in the water, and either had his clothes on when he did so, or washed himself and his clothes separately. Other pollutions continued seven days, as that which was contracted by touching a dead body. That of women in their monthly courses lasted till this was over with them. Other impurities lasted 40 or 50 days; as that of women who were lately delivered, who were unclean 40 days after the birth of a boy, and 50 after the birth of a girl. Others again lasted till the person was cured.

Many of these pollutions were expiated by sacrifices; and others by a certain water or lye, made with the ashes of a red heifer, sacrificed on the great day of expiation. When the leper was cured, he went to the temple, and offered a sacrifice of two birds, one of which was killed and the other set at liberty. He who had touched a dead body, or had been present at a funeral, was to be purified with the water of expiation, and this upon pain of death. The woman who had been delivered, offered a turtle and a lamb for her expiation; or if she was poor, two turtles or two young pigeons.

These impurities, which the law of Moses has expressed with the greatest accuracy and care, were only

figures of other more important impurities, such as the sins and iniquities committed against God, or faults committed against our neighbour. The fables and prophecies of the Old Testament were sensible of this; and our Saviour, in the gospel, has strongly inculcated, that they are not outward and corporeal pollutions which render us unacceptable to God, but such inward pollutions as infect the soul, and are violations of justice, truth, and charity.

IMPUTATION, in general, the charging something to the account of one, which belonged to another: thus, the assertors of original sin maintain, that Adam's sin is imputed to all his posterity.

In the same sense, the righteousness and merits of Christ are imputed to true believers.

INACCESSIBLE, something that cannot be come at, or approached, by reason of intervening obstacles, as a river, rock, &c. It is chiefly used in speaking of heights and distances. See **GEOMETRY**.

INACHUS, founder of the kingdom of Argos, 1856 B. C. See **ARGOS**.

INALIENABLE, that which cannot be legally alienated or made over to another: thus the dominions of the king, the revenues of the church, the estates of a minor, &c. are inalienable, otherwise than with a reserve of the right of redemption.

INANIMATE, a body that has either lost its soul, or that is not of a nature capable of having any.

INANITION, among physicians, denotes the state of the stomach when empty, in opposition to repletion.

INARCHING, in gardening, is a method of grafting, commonly called *grafting by approach*; and is used when the stock intended to graft on, and the tree from which the graft is to be taken, stand so near, or can be brought so near, that they may be joined together. The branch to be inarched is to be fitted to that part of the stock where it is to be joined; the rind and wood are to be paired away on one side for the length of three inches, and the stock or branch where the graft is to be united must be served in the same manner, so that the two may join equally, and the sap meet. A little tongue is then to be cut upwards in the graft, and a notch made in the stock to admit it; so that, when they are joined, the tongue will prevent their slipping, and the graft will more closely unite to the stock. Having thus brought them exactly together, they must be tied with some bals, or worsted, or other soft tying; and then the place must be covered with some grafting clay, to prevent the air from drying the wound, and the wet from rotting the stock. A stake must be fixed in the ground, to which both the stock and the graft must be tied to prevent the winds from displacing them. When they have remained in this state for four months, they will be sufficiently united, and the graft may then be cut off from the mother-tree, observing to slope it close to the stock; and at this time there should be fresh clay laid all round the part. This operation should be performed in April or May, that the graft may be perfectly united to the stock before the ensuing winter.

Inarching is chiefly practised upon oranges, myrtles, jessamines, walnuts, firs, and some other trees which do not succeed well in the common way of grafting. But it is a wrong practice when orange-trees are de-

imputation
inarching.

inauguration
Incense.

designed to grow large, for these are seldom long-lived after the operation.

INAUGURATION, the coronation of an emperor or king, or the consecration of a prelate: so called from the ceremonies used by the Romans, when they were received into the college of augurs.

INCA, or **YNCA**, a name given by the natives of Peru to their kings and the princes of the blood. Pedro de Cieca, in his Chronicle of Peru, gives the origin of the incas; and says, that that country was, for a long time, the theatre of all manner of crimes, of war, dissention, and the most dreadful disorders, till at last two brothers appeared, one of whom was called *Mangocapa*; of this person, the Peruvians relate many wonderful stories. He built the city of Cusco, made laws, established order and harmony by his wife regulations; and he and his descendants took the name of *incas*, which signifies king or great lord. These incas became so powerful, that they rendered themselves masters of all the country from Paillo to Chili, and from the river Maule on the south to the river Augasmago on the north; these two rivers forming the bounds of their empire, which extended above thirteen hundred leagues in length. This they enjoyed till the divisions between Inca Guascar and Atabalipa; which the Spaniards laying hold of, made themselves masters of the country, and destroyed the empire of the incas. See **PERU**.

INCAMERATION, a term used in the chancery of Rome, for the uniting of lands, revenues, or other rights, to the pope's domain.

INCANTATION, denotes certain ceremonies, accompanied with a formula of words, and supposed to be capable of raising devils, spirits, &c. See **CHARM**, &c.

INCAPACITY, in the canon-law, is of two kinds: 1. The want of a dispensation for age in a minor, for legitimization in a bastard, and the like: this renders the provision of a benefice void in its original. 2. Crimes and heinous offences, which annul provisions at first valid.

INCARNATION, in theology, the act whereby the second Person of the Holy Trinity assumed the human nature, viz. a true body and reasonable soul, in order to accomplish the redemption of fallen mankind.

INCARNATIVES, in surgery, medicines which assist nature in filling up wounds or ulcers with flesh; or rather remove the obstructions thereto.

INCENSE, or **FRANKINCENSE**, in the materia medica, &c. a dry resinous substance, known among authors by the names *THUS* and *OLIBANUM*.

Incense is a rich perfume, with which the Pagans, and the Roman-Catholics still, perfume their temples, altars, &c.—The word comes from the Latin *incensum*, q. d. *burnt*; as taking the effect for the thing itself.

The burning of incense made part of the daily service of the ancient Jewish church. The priests drew lots to know who should offer it: the destined person took a large silver dish, in which was a censor full of incense; and being accompanied by another priest carrying some live coals from the altar, went into the temple. There, in order to give notice to the people, they struck upon an instrument of brass placed

Vol. V.

between the temple and the altar; and being returned to the altar, he who brought the fire left it there, and went away. Then the offerer of incense having said a prayer or two, waited the signal, which was the burning of the holocaust; immediately upon which he set fire to the incense, the whole multitude continuing all the time in prayer. The quantity of incense offered each day, was half a pound in the morning, and as much at night.

One reason of this continual burning of incense might be, that the multitude of victims that were continually offered up, would have made the temple smell like a slaughter-house, and consequently have inspired the comers rather with disgust and aversion, than awe and reverence, had it not been overpowered by the agreeable fragrance of those perfumes.

INCEST, the crime of venereal commerce between persons who are related in a degree: wherein marriage is prohibited by the law of the country.

Some are of opinion, that marriage ought to be permitted between kinsfolks, to the end that the affection so necessary in marriage might be heightened by this double tie: yet the rules of the church have formerly extended this prohibition even to the seventh degree; but time has now brought it down to the third or fourth degree.

Most nations look on incest with horror, Persia and Egypt alone excepted. In the history of the ancient kings of those countries we meet with instances of the brother's marrying the sister; the reason was, because they thought it too mean to join in alliance with their own subjects, and still more so to have married into any foreign family.

INCEST Spiritual, a crime committed in like manner between persons who have a spiritual alliance by means of baptism or confirmation.

Spiritual incest is also understood of a vicar, or other beneficiary, who enjoys both the mother and daughter; that is, holds two benefices, the one whereof depends upon the collation of the other.

Such a spiritual-incest renders both the one and the other of these benefices vacant.

INCH, a well-known measure of length; being the twelfth part of a foot, and equal to three barley-corns in length.

INCH of Candle, (sale by). See **CANDLE**.

INCHANTMENT. See **WITCHCRAFT**.

INCIDENCE, denotes the direction in which one body strikes on another. See **OPTICS** and **MECHANICS**.

Angle of INCIDENCE. See **ANGLE**.

INCIDENT DILIGENCE, in Scots law, a warrant granted by a lord ordinary in the court of session, for citing witnesses for proving any point, or for production of any writing necessary for preparing the cause for a final determination, or before it goes to a general proof.

INCISIVE, an appellation given to whatever cuts or divides: thus, the foreteeth are called *dentes incisivi*, or cutters; and medicines of an attenuating nature, *incidenti*, or incisive medicines.

INCLE, a kind of tape made of linen yarn.

INCLINATION, is a word frequently used by mathematicians, and signifies the mutual approach, tendency, or leaning of two lines or two planes to-

22 D

wards

Incest
Inclination.

Inclined
||
Incus.

wards each other, so as to make an angle.

INCLINED PLANE, in mechanics, one that makes an oblique angle with the horizon. See **MECHANICS**.

INCOGNITO, or **INCOG**, is applied to a person who is in any place where he would not be known: but it is more particularly applied to princes, or great men, who enter towns, or walk the streets, without their ordinary train or the usual marks of their distinction and quality.

INCOMBUSTIBLE, something that cannot be burnt, or consumed by fire. See **ASBESTUS**.

INCOMMENSURABLE, a term in geometry, used where two lines, when compared to each other, have no common measure, how small soever, that will exactly measure them both. And in general, two quantities are said to be incommensurable, when no third quantity can be found that is an aliquot part of both.

INCOMMENSURABLE Numbers, are such as have no common divisor that will divide them both equally.

INCOMPATIBLE, that which cannot subsist with another without destroying it: thus cold and heat are incompatible in the same subject, the strongest overcoming and expelling the weakest.

INCORPORATION, in pharmacy, is much the same as imputation, being a reduction of dry substances to the consistence of a paste, by the admixture of some fluid: thus pills, boles, troches, and plasters, are made by incorporation. Another incorporation is when things of different consistencies are by digestion reduced to one common consistence.

INCORPORATION, or **Body-Corporate**. See **CORPORATION**.

INCRASSATING, in pharmacy, &c. the rendering of fluids thicker by the mixture of other substances less fluid, or by the evaporation of the thinner parts.

INCUBATION, the action of a hen, or other fowl, brooding on her eggs. See **HATCHING**.

INCUBUS, **NIGHT-MARE**, a disease consisting in an oppression of the breast, so very violent, that the patient cannot speak or even breathe. The word is derived from the Latin *incubare*, to "lie down" on any thing and press it: the Greeks call it *spanaxine*, q. d. *fallator*, "leaper," or one that rusheth on a person.

In this disease the senses are not quite lost, but drowned and astonished, as is the understanding and imagination; so that the patient seems to think some huge weight thrown on him, ready to strangle him. Children are very liable to this distemper; so are fat people, and men of much study and application of mind; by reason the stomach in all these finds some difficulty in digestion. See (*Index* subjoined to) **MEDICINE**.

INCUMBENT, a clerk or minister who is resident on his benefice; he is called *incumbent*, because he does, or at least ought to bend his whole study to discharge the cure of his church.

INCURVATION of the **RAYS** of **LIGHT**, their bending out of a rectilinear straight course, occasioned by refraction. See **OPTICS**.

INCUS, in anatomy, a bone of the internal ear, somewhat resembling one of the anterior dentes mo-

lars. See **ANATOMY**, n° 405. c.

INDEFEASIBLE, a term in law for what cannot be defeated or made void; as an indefeasible estate of inheritance, &c.

INDEFEASIBLE Right to the Throne. See **HEREDITARY Right**.

INDEFINITE, that which has no certain bounds, or to which the human mind cannot affix any.

INDEFINITE, in grammar, is understood of nouns, pronouns, verbs, participles, articles, &c. which are left in an uncertain indeterminate sense, and not fixed to any particular time, thing, or other circumstance.

INDELIBLE, something that cannot be cancelled or effaced.

INDEMNITY, in law, the saving harmless; or a writing to secure one from all damage and danger that may ensue from any act.

INDENTED, in heraldry, is when the outline of an ordinary is notched like the teeth of a saw.

INDEPENDENTS, a sect of Protestants in Britain and Holland, so called from their independency on other churches, and their maintaining, that each church or congregation has sufficient power to act and perform every thing relating to religious government within itself, and is no way subject or accountable to other churches or their deputies.

They therefore disallow parochial and provincial subordination, and form all their congregations upon a scheme of co-ordinancy. But though they do not think it necessary to assemble synods, yet if any be held, they look upon their resolutions as prudential counsels, but not as decisions to which they are obliged to conform.

The present Independents differ from the Presbyterians only in their church-government; in being generally more attached to the doctrines distinguished by the term *orthodoxy*, such as original sin, election, reprobation, &c.; and in administering the Lord's Supper at the close of the afternoon's service. See **PRESBYTERIANS**.

The several sects of Baptists are all Independents with respect to church-government; and, like them, administer the Lord's Supper in the evening; whereas the Presbyterians administer it after the forenoon's service. See **ANABAPTISTS**.

INDETERMINATE, in general, an appellation given to whatever is not certain, fixed, and limited; in which sense it is the same with *indefinite*.

INDEX, in arithmetic and algebra, shews to what power any quantity is involved, and is otherwise called its *exponent*. See **ALGEBRA**, n° 9.

Expurgatory INDEX, a catalogue of prohibited books in the church of Rome.

The first catalogues of this kind were made by the inquisitors; and these were afterwards approved of by the council of Trent, after some alteration was made in them by way of retrenchment or addition. Thus an index of heretical books being formed, it was confirmed by a bull of Clement VIII. in 1595, and printed with several introductory rules; by the fourth of which, the use of the scriptures in the vulgar tongue if forbidden to all persons without a particular licence; and by the tenth rule it is ordained, that no book shall be printed at Rome, without the approbation of the Pope's vicar, or some person delegated by the Pope;

indefeasible
||
Index.

India II. Indictment. nor in any other places, unless allowed by the bishop of the diocese, or some person deputed by him, or by the inquisitor of heretical practice.

The Trent index being thus published, Philip II. of Spain ordered another to be printed at Antwerp, in 1571, with considerable enlargements. Another index was published in Spain in 1584; a copy of which was snatched out of the fire when the English plundered Cadiz. Afterwards there were several expurgatory indexes printed at Rome and Naples, and particularly in Spain.

INDIA PROPER, or HITHER INDIA, a large peninsula in Asia, bounded on the north by Ubec Tartary and Thibet; on the east, by another part of Thibet, the kingdom of Afem, Ava, and Pegu; on the south, by the bay of Bengal and the Indian ocean; and by the same ocean and Persia, on the west; situated between 66° and 92° of east longitude, and between 7° and 40° of north latitude: being about 2000 miles in length from north to south, and 1500 miles in breadth from east to west where broadest; though the southern part of the peninsula is not 300 miles broad. All the country within these limits is either subject or tributary to the great Mogul. It is frequently called *Indoflan*; a name supposed to be derived from the river Indus, on its western frontiers: it is also called the *Mogulflan*, from the imperial family now upon the throne, who trace their pedigree from Tamerlane, a Mogul Tartar. See *MOGULS*.

INDIA *beyond the Ganges*, is a country bounded by Thibet and Boutan on the north; by China, Tonquin, and Cochinchina, on the east; by the Indian Ocean, on the south; and by the hither India, the bay of Bengal, and the straits of Malacca, on the west: it is situated between 92° and 104° of east longitude, and between the equator and 30° degrees of north latitude: being near 2000 miles in length from north to south, but of a very unequal breadth; in which limits are comprehended the kingdoms of Afem, Ava, Pegu, Laos, Siam, Cambodia, and Malacca, governed by as many Indian princes; only the Dutch have usurped the dominion of Malacca.

INDIAN *Berry*. See *COCCULUS*.

INDIAN *Ink*. See *INK*.

INDICATION, in phisic, whatever serves to direct the physician how to act.

INDICATIVE, in grammar, the first mood or manner of conjugating a verb, by which we simply affirm, deny, or ask something: as, *amant*, they love; *non amant*, they do not love; *amantne*? do they love?

INDICTION, in chronology, a cycle of 15 years. See *CYCLE*.

INDICTMENT, in law, one of the modes of prosecuting an offender. See *PROSECUTION*.

If English law, it is a written accusation of one or more persons of a crime or misdemeanor, preferred to, and presented upon oath by, a grand jury. To this end, the sheriff of every county is bound to return to every session of the peace, and every commission of *oyer and terminer*, and of general gaol-delivery, twenty-four good and lawful men of the county, some out of every hundred, to inquire, present, do, and execute all those things, which on the part of our lord the king shall then and there be commanded them.

They ought to be freeholders; but to what amount is Indictment. uncertain: which seems to be *casus omisus*, and as proper to be supplied by the legislature as the qualifications of the petit jury; which were formerly equally vague and uncertain, but are now settled by several acts of parliament. However, they are usually gentlemen of the best figure in the county. As many as appear upon this pannel, are sworn upon the grand jury, to the amount of twelve at the least, and not more than twenty-three; that twelve may be a majority. Which number, as well as the constitution itself, we find exactly described so early as the laws of King Ethelred: *Exeant seniores duodecim thani, et Wilk. II. praefectus cum eis, et jurent super sanctuarium quod Ang. Lex. eis in manus datur, quod nolint ullum innocentem accusare, nec aliquem noxium celare.* 117.

In the time of King Richard I. (according to Hoveden), the process of electing the grand jury, ordained by that prince, was as follows: Four knights were to be taken from the county at large, who chose two more out of every hundred; which two associated to themselves ten other principal freemen, and those twelve were to answer concerning all particulars relating to their own district. This number was probably found too large and inconvenient; but the traces of this institution still remain, in that some of the jury must be summoned out of every hundred. This grand jury are previously instructed in the articles of their inquiry, by a charge from the judge who presides upon the bench. They then withdraw to sit and receive indictments, which are preferred to them in the name of the king, but at the suit of any private prosecutor; and they are only to hear evidence on behalf of the prosecution: for the finding of an indictment is only in the nature of an inquiry or accusation, which is afterwards to be tried and determined; and the grand jury are only to inquire upon their oaths, whether there be sufficient cause to call upon the party to answer it. A grand jury, however, ought to be thoroughly persuaded of the truth of an indictment, so far as their evidence goes; and not to rest satisfied merely with remote probabilities: a doctrine that might be applied to very oppressive purposes.

The grand jury are sworn to inquire only for the body of the county, *pro corpore comitatus*; and therefore they cannot regularly inquire of a fact done out that county for which they are sworn, unless particularly enabled by act of parliament. And to so high a nicety was this matter anciently carried, that where a man was wounded in one county, and died in another, the offender was at common law indictable in neither, because no complete act of felony was done in any one of them: but by statute 2 and 3 Ed. VI. c. 24. he is now indictable in the county where the party died. And, by statute 2 Geo. II. c. 21. if the stroke or poisoning be in England, and the death upon the sea or out of England, or *vice versa*, the offenders, and their accessories, may be indicted in the county where either the death, poisoning, or stroke, shall happen. And so in some other cases; as, particularly, where treason is committed out of the realm, it may be inquired of in any county within the realm, as the king shall direct, in pursuance of statutes 26 Hen. VIII. c. 13. 33.; Hen. VIII. c. 23. 35.; Hen. VIII. c. 2. 5. 6.; Edw. VI. c. 11. And

Indictment. counterfeiters, wafers, or minishers, of the current coin, together with all manner of felons and their accessories, may, by statute 26 Hen. VIII. c. 6. (confirmed and explained by 34 and 35 Hen. VIII. c. 26. § 75. 76.) be indicted and tried for those offences, if committed in any part of Wales, before the justices of gaol-delivery and of the peace, in the next adjoining county of England, where the king's writ runneth; that is, at present in the county of Hereford or Salop; and not, as it should seem, in the county of Chelster or Monmouth: the one being a county palatine where the king's writ did not run; and the other a part of Wales, in 26 Hen. VIII. Murders also, whether committed in England or in foreign parts, may, by virtue of the statute 33 Hen. VIII. c. 23. be inquired of and tried by the king's special commission in any shire or place in the kingdom. By statute 10 and 11 W. III. c. 25. all robberies, and other capital crimes, committed in Newfoundland, may be inquired of and tried in any county in England. Offences against the black act, 9 Geo. I. c. 22. may be inquired of and tried in any county of England, at the option of the prosecutor. So felonies in destroying turnpikes, or works upon navigable rivers, erected by authority of parliament, may, by statutes 8 Geo. II. c. 20. and 13 Geo. III. c. 84. be inquired of and tried in any adjacent county. By statute 26 Geo. II. c. 19. plundering or stealing from any vessel in distress or wrecked, or breaking any ship contrary to 12 Ann. ft. 2. c. 18. may be prosecuted either in the county where the fact is committed, or in any county next adjoining; and if committed in Wales, then in the next adjoining English county: by which is understood to be meant, such English county as, by the statute 26 Hen. VIII. above mentioned, had before a concurrent jurisdiction of felonies committed in Wales. Felonies committed out of the realm, in burning or destroying the king's ships, magazines, or stores, may, by statute 12 Geo. III. c. 24. be inquired of and tried in any county of England, or in the place where the offence is committed. By statute 13 Geo. III. c. 63. misdemeanors committed in India may be tried upon information or indictment in the court of king's-bench in England; and a mode is marked out for examining witnesses by commission, and transmitting their depositions to the court. But, in general, all offences must be inquired into, as well as tried, in the county where the fact is committed. Yet if larciny be committed in one county, and the goods carried into another, the offender may be indicted in either; for the offence is complete in both. Or he may be indicted in England for larciny in Scotland, and carrying the goods with him into England, or *vice versa*; or for receiving in one part of the united kingdom goods that have been stolen in another. But for robbery, burglary, and the like, he can only be indicted where the fact was actually committed: for though the carrying away and keeping of the goods is a continuation of the original taking, and is therefore larciny in the second county, yet it is not a robbery or burglary in that jurisdiction. And if a person be indicted in one county for larciny of goods originally taken in another, and be thereof convicted, or stands mute, he shall not be admitted to his clergy; provided the original taking be attended with such

circumstances as would have ousted him of his clergy Indictment. by virtue of any statute made previous to the year 1691.

When the grand jury have heard the evidence, if they think it a groundless accusation, they used formerly to endorse on the back of the bill, *Ignoramus*; or, We know nothing of it: intimating, that though the facts might possibly be true, that truth did not appear to them. But now they assent in English more absolutely, *Not a true bill*; or (which is the better way) *Not found*; and then the party is discharged without farther answer. But a fresh bill may afterwards be preferred to a subsequent grand jury. If they are satisfied of the truth of the accusation, they then endorse upon it, "A true bill;" anciently, *Billa vera*. The indictment is then said to be found, and the party stands indicted. But to find a bill, there must at least twelve of the jury agree: for so tender is the law of England of the lives of the subjects, that no man can be convicted at the suit of the king of any capital offence, unless by the unanimous voice of twenty-four of his equals and neighbours; that is, by twelve at least of the grand jury, in the first place, assenting to the accusation; and afterwards by the whole petit jury, of twelve more, finding him guilty upon his trial. But if twelve of the grand jury assent, it is a good presentment, though some of the rest disagree. And the indictment, when so found, is publicly delivered into court.

Indictments must have a precise and sufficient certainty. By statute 1 Hen. V. c. 5. all indictments must set forth the Christian name, surname, and addition of the state and degree, mystery, town, or place, and the county of the offender; and all this to identify his person. The time and place are also to be ascertained, by naming the day and township in which the fact was committed: though a mistake in these points is in general not held to be material, provided the time be laid previous to the finding of the indictment, and the place to be within the jurisdiction of the court; unless where the place is laid, not merely as a *venue*, but as part of the description of the fact. But sometimes the time may be very material, where there is any limitation in point of time assigned for the prosecution of offenders; as by the statute 7 Will. III. c. 3. which enacts, that no prosecution shall be had for any of the treasons or misprisons therein mentioned, (except an assassination designed or attempted on the person of the king), unless the bill of indictment be found within three years after the offence committed: and, in case of murder, the time of the death must be laid within a year and a day after the mortal stroke was given. The offence itself must also be set forth with clearness and certainty; and in some crimes particular words of art must be used, which are so appropriated by the law to express the precise idea which it entertains of the offence, that no other words, however synonymous they may seem, are capable of doing it. Thus, in treason, the facts must be laid to be done "treasonably, and against his allegiance;" anciently, *proditorie et contra ligeantie sue debitum*; else the indictment is void. In indictments for murder, it is necessary to say that the party indicted "murdered," not "killed" or "slew," the other; which, till the late statute, was expressed in Latin by the word *murdravit*.

dravit. In all indictments for felonies, the adverb "feloniously," *felonice*, must be used; and for burglaries also, *burglariter*, or, in English, "burglariously;" and all these to ascertain the intent. In rapes, the word *rapuit*, or "ravished," is necessary, and must not be expressed by any periphrasis, in order to render the crime certain. So in larcinies also, the words *felonice cepit et asportavit*, "feloniously took or carried away," are necessary to every indictment; for these only can express the very offence. Also, in indictments for murder, the length and depth of the wound should in general be expressed, in order that it may appear to the court to have been of a mortal nature: but if it goes through the body, then its dimensions are immaterial; for that is apparently sufficient to have been the cause of the death. Also, where a limb, or the like, is absolutely cut off, there such description is impossible. Lastly, in indictments, the *value* of the thing which is the subject or instrument of the offence, must sometimes be expressed. In indictments for larcinies this is necessary, that it may appear whether it be grand or petit larciny; and whether intitled or not to the benefit of clergy. In homicides of all sorts it is necessary; as the weapon with which it is committed is forfeited to the king as a deadend. For the manner of process upon an indictment, see PROCESS.

INDICTMENT, in Scots law, the name of the summons, or libel, upon which criminals are cited before the court of judicatory to stand trial. See LAW, Part III. n° clxxxvi. 44.

Plea to INDICTMENT. See PLEA.

INDIES, East and West. See INDIA, and AMERICA.

INDIGESTION, in medicine, a crudity, or want of due coction, either in the food, an humour of the body, or an excrement. See ANOREXIA, APEPSIA, and (*Index* subjoined to) MEDICINE.

INDIGETES, a name which the ancients gave to some of their gods.—There are various opinions about the signification of this word; some maintaining it was given to all the gods in general; others only to the semi-gods, or great men deified. Others say, it was given to such gods as were originally of the country, or rather such as were the gods of the country that bore this name. Others, again, hold that it was ascribed to such gods as were patrons and protectors of particular cities.

INDIGO, a dye prepared from the leaves and small branches of the *Indigofera Tinctoria*. See INDIGOFERA.

INDIGOFERA, the INDIGO PLANT; a genus of the decandria order, belonging to the diadelphica class of plants.—There are five species; the most remarkable of which is the *tinctoria*, a native of the warm parts of Asia, Africa, and America, and from which the Indigo dye is made. The root of this plant is three or four lines thick, and more than a foot long, of a faint smell something like parsley. From this root issues a single stem nearly of the same thickness, about two feet high, straight, hard, almost woody, covered with a bark slightly split, of a grey ash-colour towards the bottom, green in the middle, reddish at the extremity, and without appearance of pith in the inside. The leaves, ranged in pairs around the stalk, are of an oval form, smooth, soft to the touch, fur-

rowed above, of a deep green on the under-side, and connected by a very short peduncle. From about one-third of the stem to the extremity there are ears that are loaded with very small flowers from a dozen to 15, but destitute of smell. The pistil, which is in the midst of each flower, changes into a pod, in which the seeds are inclosed.

This plant requires a smooth rich soil, well tilled, and not too dry. The seed of it, which, as to figure and colour, resembles gun-powder, is sowed in little furrows that are about the breadth of the hoe, two or three inches deep, at a foot's distance from each other, and in a straight line as possible. Continual attention is required to pluck up the weeds, which would soon choke the plant. Though it may be sown in all seasons, the spring is commonly preferred. Moisture causes this plant to shoot above the surface in three or four days. It is ripe at the end of two months. When it begins to flower, it is cut with pruning-knives; and cut again at the end of every six weeks, if the weather is a little rainy. It lasts about two years, after which term it degenerates; it is then plucked up, and planted afresh. As this plant soon exhausts the soil, because it does not absorb a sufficient quantity of air and dew to moisten the earth, it is of advantage to the planter to have a vast space which may remain covered with trees, till it becomes necessary to fell them in order to make room for the indigo.

Indigo is distinguished into two kinds, the *true* and the *bastard*. Though the first is sold at a higher price on account of its superiority, it is usually advantageous to cultivate the other, because it is heavier. The first will grow in many different soils; the second succeeds best in those which are most exposed to the rain. Both are liable to great accidents. Sometimes the plant becomes dry, and is destroyed by an insect frequently found on it; at other times, the leaves, which are the valuable part of the plant, are devoured in the space of 24 hours by caterpillars. This last misfortune, which is but too common, has given occasion to the saying, "that the planters of indigo go to bed rich, and rise in the morning totally ruined."

This production ought to be gathered in with great precaution, for fear of making the farina that lies on the leaves, and is very valuable, fall off by shaking it. When gathered, it is thrown into the sleeping-vat, which is a large tub filled with water. Here it undergoes a fermentation, which in 24 hours at furthest is completed. A cock is then turned, to let the water run into the second tub, called the *mortar* or *pounding tub*. The sleeping-vat is then cleaned out, that fresh plants may be thrown in; and thus the work is continued without interruption.

The water which has run into the pounding-tub is found impregnated with a very subtle earth, which alone constitutes the dregs or blue substance that is the object of this process, and which must be separated from the useless salt of the plant, because this makes the dregs swim on the surface. To effect this, the water is forcibly agitated with wooden buckets, that are full of holes and fixed to a long handle. This part of the process requires the greatest precautions. If the agitation be discontinued too soon, the part that

Indigofera
Indostan.

that is used in dying, not being sufficiently separated from the salt, would be lost. If, on the other hand, the dye were to be agitated too long after the complete separation, the parts would be brought together again, and form a new combination; and the salt reacting on the dregs, would excite a second fermentation, that would alter the dye, spoil its colour, and make what is called *burnt indigo*. These accidents are prevented by a close attention to the least alterations that the dye undergoes, and by the precaution which the workmen take to draw out a little of it from time to time in a clean vessel. When they perceive that the coloured particles collect by separating from the rest of the liquor, they leave off shaking the buckets, in order to allow time to the blue dregs to precipitate to the bottom of the tub, where they are left to settle till the water is quite clear.—Holes made in the tub, at different heights, are then opened one after another, and this useless water is let out.

The blue dregs remaining at the bottom having acquired the consistence of a thick muddy liquid, cocks are then opened, which draw it off into the settler. After it is still more cleared of much superfluous water in this third and last tub, it is drained into sacks; from whence, when water no longer filters through the cloth, this matter, now become of a thicker consistence, is put into chests, where it entirely loses its moisture. At the end of three months the indigo is fit for sale.

It is used, in washing, to give a blueish colour to linen: painters also employ it in their water-colours; and dyers cannot make fine blue without indigo. The ancients procured it from the East-Indies; in modern times, it has been transplanted into America. The cultivation of it, successfully attempted at different places, appears to be fixed at Carolina, St. Domingo, and Mexico. That which is known under the name of *Guatemala indigo*, from whence it comes, is the most perfect of all.

INDIVIDUAL, a particular being of any species, or that which cannot be divided into two or more beings equal or alike.

The usual division in logic is made into *genera*, or into *genus's*; those *genera* into *species*; and those *species* into *individuals*.

INDIVISIBLE, among metaphysicians.—A thing is said to be absolutely *indivisible*, that is a simple being, and consists of no parts into which it may be divided. Thus, God is *indivisible* in all respects; as is also the human mind; not having extension, or other properties of body.

INDIVISIBLES, in geometry, the elements or principles into which any body or figure may be ultimately resolved; which elements are supposed to be infinitely small: thus, a line may be said to consist of points, a surface of parallel lines, and a solid of parallel and similar surfaces.

INDORSEMENT, in law, any thing written on the back of a deed; as a receipt for money received.

There is likewise an *indorsement*, by way of assignment, on bills of exchange and notes of hand; which is done by writing a person's name on the back thereof.

INDOSTAN, PROPER INDIA, or the *Empire of*

the *Great Mogul*; a country of Asia, bounded on the west by Persia, on the south by the western peninsula of India, on the east by the eastern peninsula, and on the north by several kingdoms of Independent Tartary, and comprehending a considerable part of the ancient India; more, indeed, than the ancient Greeks and Romans ever had any distinct knowledge of.

The period in which the country of Indostan was originally peopled is now totally unknown. The aversion which the Indians themselves have to discover their history to foreigners, has involved it in deep obscurity; and what can be collected from the historians of Greece and Rome, does little more than let us know that such a people as the Indians existed in their days. The only light we have to direct us on this obscure subject, is derived from an historical poem founded upon fact, and translated into the Persian language in the reign of Mohammed Akbar, who died in the 1605th year of the Christian era; and even this account is exceedingly barren of interesting particulars: so that, till the time of the invasion of the Moguls, the history of Indostan affords nothing either instructing or amusing; for which reason, it more properly comes under the articles *MOGUL*, and *MOGUL'S Empire*.

In almost all ages, the inhabitants of this country have been remarkable for their riches, their sloth, and their effeminacy; which have rendered them a prey to many barbarous invaders, who in their turn have degenerated and been subdued by others. Their sloth and effeminacy seems in a great measure to be owing to their system of religion; though no doubt some natural causes, such as the climate, &c. also concur. The Indians are directed by their religion to esteem absolute inactivity or idleness the summit of all earthly, and indeed heavenly happiness; since, according to them, their great god Brama himself hath been eternally doing nothing, and will continue to eternity in the same state of inactivity. In consequence of this principle, they carry their inactivity to a surprizing and almost incredible height; they yield to every oppressor, and suffer themselves to be tyrannized over by foreign as well as domestic despots.—A great part of the country is now subject to the English East-India Company: but for a full account of the extent of their jurisdiction, as well as the dispositions, manners, customs, &c. of the inhabitants, see the articles abovementioned; also *BRAMA*, *BRACHMAN*, and *BRAMIN*.

INDUCTION. See *LOGIC*, n° 98, 99; and *ORATORY*, n° 32.

INDUCTION, in law, is putting a clerk or clergyman in possession of a benefice or living to which he is collated or presented. See the article *PARSON*.—Induction is performed by a mandate from the bishop to the arch-deacon, who usually issues out a precept to other clergymen to perform it for him. It is done by giving the clerk corporal possession of the church, as by holding the ring of the door, tolling a bell, or the like; and is a form required by law, with intent to give all the parishioners due notice, and sufficient certainty of their new minister, to whom their tithes are to be paid. This therefore is the investiture of the temporal part of the benefice, as institution

Indostan
Induction

Indulgence is of the spiritual. And when a clerk is thus presented, instituted, and inducted into a rectory, he is then, and not before, in full and complete possession; and is called in law *persona impersonata*, or *person impersonae*.

INDULGENCES, in the Romish church, are a remission of the punishment due to sins, granted by the church, and supposed to save the sinner from Purgatory.

According to the doctrine of the Romish church, all the good works of the saints over and above those which were necessary towards their own justification, are deposited, together with the infinite merits of Jesus Christ, in one inexhaustible treasury. The keys of this were committed to St Peter, and to his successors the popes, who may open it at pleasure, and by transferring a portion of this superabundant merit to any particular person, for a sum of money, may convey to him either the pardon of his own sins, or a release for any one in whom he is interested, from the pains of Purgatory. Such indulgences were first invented in the 11th century, by Urban II. as a recompense for those who went in person upon the glorious enterprise of conquering the Holy Land. They were afterwards granted to those who hired a soldier for that purpose; and in process of time were bestowed on such as gave money for accomplishing any pious work enjoined by the Pope.

The power of granting indulgences has been greatly abused in the church of Rome. Pope Leo X. in order to carry on the magnificent structure of St Peter's at Rome, published indulgences, and a plenary remission to all such as should contribute money towards it. Finding the project take, he granted to Albert elector of Mentz, and archbishop of Magdeburg, the benefit of the indulgences of Saxony and the neighbouring parts, and farmed out those of other countries to the highest bidders; who, to make the best of their bargain, procured the ablest preachers to cry up the value of the ware. The form of these indulgences was as follows. "May our Lord Jesus Christ have mercy upon thee, and absolve thee by the merits of his most holy passion. And I, by his authority, that of his blessed apostles Peter and Paul, and of the most holy Pope, granted and committed to me in these parts, do absolve thee, first, from all ecclesiastical censures, in whatever manner they have been incurred; then from all thy sins, transgressions, and excesses, how enormous soever they may be, even from such as are referred for the cognizance of the holy see, and as far as the keys of the holy church extend: I remit to you all punishment which you deserve in Purgatory on their account; and I restore you to the holy sacraments of the church, to the unity of the faithful, and to that innocence and purity which you possessed at baptism; so that when you die, the gates of punishment shall be shut, and the gates of the paradise of delight shall be opened: and if you shall not die at present, this grace shall remain in full force when you are at the point of death. In the name of the Father, and of the Son, and of the Holy Ghost."

The terms in which the retailers of indulgences, described their benefits and the necessity of purchasing them, are so extravagant, that they appear almost incredible. If any man (said they) purchases letters of

indulgence, his soul may rest secure with respect to its salvation. The souls confined in purgatory, for whose redemption indulgences are purchased, as soon as the money tinkles in the chest, instantly escape from that place of torment, and ascend into heaven. That the efficacy of indulgences was so great, that the most heinous sins, even if one should violate (which was impossible) the mother of God, would be remitted and expiated by them, and the person be freed both from punishment and guilt. That this was the unspeakable gift of God, in order to reconcile men to himself. That the crosses erected by the preachers of indulgences was equally efficacious with the crosses of Christ itself. "Lo! the heavens are open; if you enter not now, when will you enter? For twelve pence you may redeem the soul of your father out of purgatory; and are you so ungrateful, that you will not rescue your parent from torment? If you had but one coat, you ought to strip yourself instantly, and sell it, in order to purchase such benefits," &c.

It was this great abuse of indulgences that contributed not a little to the first reformation of religion in Germany, where Martin Luther began first to declaim against the preachers of indulgences, and afterwards against indulgences themselves: but since that time the popes have been more sparing in the exercise of this power: however, they still carry on a great trade with them to the Indies, where they are purchased at two rials a-piece, and sometimes more.

The pope likewise grants indulgences to persons at the point of death; that is, he grants them, by a brief, power to choose what confessor they please, who is authorized thereby to absolve them from all their sins in general.

INDULT, in the church of Rome, the power of presenting to benefices granted to certain persons by the pope. Of this kind is the indult of kings and sovereign princes in the Romish communion, and that of the parliament of Paris granted by several popes. By the concordat for the abolition of the pragmatic sanction, made between Francis I. and Leo X. in 1516, the French king has the power of nominating to bishoprics, and other consistorial benefices, within his realm. At the same time, by a particular bull, the pope granted him the privilege of nominating to the churches of Britany and Provence. In 1648 pope Alexander VIII. and in 1668 Clement IX. granted the king an indult for the bishoprics of Metz, Toul, and Verdun, which had been yielded to him by the treaty of Munster; and in 1668 the same pope Clement IX. granted him an indult for the benefices in the counties of Roussillon, Artois, and the Netherlands. The cardinals likewise have an indult granted them by agreement between pope Paul IV. and the sacred college in 1555, which is always confirmed by the popes at the time of their election. By this treaty the cardinals have the free disposal of all the benefices depending on them, and are empowered likewise to bestow a benefice in *commendam*.

INDULTO, a duty, tax, or custom, paid to the king of Spain for all such commodities as are imported from the West Indies in the galleons.

INDUS, a large river of Asia, which rises in the mountains which separate Tartary from India, and discharges itself into the Indian ocean.

INERTIA.

Indult
||
Indus.

INERTIA OF MATTER, in philosophy, is defined by Sir Isaac Newton to be a passive principle by which bodies persist in their motion or rest, receive motion in proportion to the force impressing it, and resist as much as they are resisted. It is also defined by the same author to be a power implanted in all matter, whereby it resists any change endeavoured to be made in its state. See **MECHANICS**.

IN ESSE is applied to things which are actually existing.

Authors make a difference between a thing *in esse*, and a thing *in posse*: a thing that is not, but may be, they say is *in posse*; or *potentia*; but a thing apparent and visible, they say is *in esse*, that is, has a real being *eo instanti*, whereas the other is casual, and at best but a possibility.

INFALLIBLE, something that cannot err, or be deceived.

One of the great controversies between the Protestants and Papists, is the infallibility which the latter attribute to the pope; though, in fact, they themselves are not agreed on that head, some placing this pretended infallibility in the pope and a general council.

INFAMY, in law, is a term which extends to forgery, perjury, gross cheats, &c. by which a person is rendered incapable of being a witness or juror, even though he is pardoned for his crimes.

INFANCY, the first part of life.—Fred. Hoffman says, that the human species are *infants* until they begin to talk, and *children* to the age of puberty.—Anatomy discovers to us, that during infancy there is much imperfection in the human frame; *e. g.* its parts are disproportioned, and its organs incapable of those functions which in future life they are designed to perform. The head is larger in proportion to the bulk of the body than that of an adult. The liver and pancreas are much larger in proportion than in advanced life; their secretions are more in quantity also. The bile is very inert; the heart is stronger and larger than in future life; the quantity of blood sent through the heart of an infant, in a given time, is also more in proportion than in adults. Though these circumstances have their important usefulness, yet the imperfection attending them subjects this age to many injuries and dangers from which a more perfect state is exempted. Dr Percival observes, in his *Essays Med. and Exp.* that of all the children who are born alive, two thirds do not live to be two years old.

Infants have a larger proportion of brain than adults, hence are more subject to nervous disorders; and hence the diagnostics of diseases are in many respects obscure or uncertain, as particularly those taken from the pulse, which, from the irritability of the tender bodies of infants, is suddenly affected by a variety of accidents too numerous, and seemingly too trivial to gain our attention. However, no very great embarrassment arises to the practitioner from hence; for the disorders in this state are generally acute, less complicated than those in adults, and are more easily discovered than is generally apprehended.—See (the *Index* subjoined to) **MEDICINE**.

INFANT, denotes a young child. See **INFANCY**.

INFANT, in law, is a person under 21 years of age; whose capacities, incapacities, and privileges, are various.

1. In *criminal matters*. The law of England does in some cases privilege an infant under the age of 21, as to common misdemeanours; so as to escape fine, imprisonment, and the like: and particularly in the cases of omission, as not repairing a bridge, or a high way, and other similar offences; for not having the command of his fortune till the age of 21, he wants the capacity to do those things which the law requires. But where there is any notorious breach of the peace, a riot, battery, or the like, (which infants when full-grown are at least as liable as others to commit); for those, an infant above the age of 14 is equally liable to suffer, as a person of the full age of 21.

With regard to capital crimes, the law is still more minute and circumspect; distinguishing with greater nicety the several degrees of age and discretion. By the ancient Saxon law, the age of twelve years was established for the age of possible discretion, when first the understanding might open: and from thence till the offender was 14, it was *etate pubertati proxima*, in which he might, or might not, be guilty of a crime, according to his natural capacity or incapacity. This was the dubious stage of discretion: but, under twelve, it was held, that he could not be guilty in will, neither after fourteen could he be supposed innocent, of any capital crime which he in fact committed. But by the law, as it now stands, and has stood at least ever since the time of Edward III. the capacity of doing ill, or contracting guilt, is not so much measured by years and days, as by the strength of the delinquent's understanding and judgment. For one lad of 11 years old may have as much cunning as another of 14; and in these cases our maxim is, that *malitia supplet etatem*. Under seven years of age, indeed, an infant cannot be guilty of felony; for then a felonious discretion is almost an impossibility in nature: but at eight years old, he may be guilty of felony. Also, under 14, though an infant shall be *prima facie* adjudged to be *doli incapax*; yet if it appear to the court and jury, that he was *doli capax*, and could discern between good and evil, he may be convicted and suffer death. Thus a girl of 13 has been burnt for killing her mistress: and one boy of ten, and another of nine years old, who had killed their companions, have been sentenced to death, and he of ten years actually hanged; because it appeared upon their trials, that the one hid himself, and the other hid the body he had killed; which hiding manifested a consciousness of guilt, and a discretion to discern between good and evil. And there was an instance in the last century, where a boy of eight years old was tried at Abingdon for firing two barns; and, it appearing that he had malice, revenge, and cunning, he was found guilty, condemned, and hanged accordingly. Thus also, in very modern times, a boy of ten years old was convicted on his own confession of murdering his bedfellow; there appearing in his whole behaviour plain tokens of a mischievous discretion; and, as the sparing this boy merely on account of his tender years might be of dangerous consequence to the public, by propagating a notion that children might commit such atrocious crimes with impunity, it was unanimously agreed by all the judges, that he was a proper subject of capital punishment. But, in all such cases, the evidence of that

Blackst.
Comment.

that malice, which is to supply age, ought to be strong and clear beyond all doubt and contradiction.

2. In *civil* matters. The ages of male and female are different for different purposes. A male at 12 years old may take the oath of allegiance; at 14 is at the years of discretion, and therefore may consent or disagree to marriage, may choose his guardian, and, if his discretion be actually proved, may make his testament of his personal estate; at 17 may be an executor; and at 21 is at his own disposal, and may alienate his lands, goods, and chattels. A female also at seven years of age may be betrothed or given in marriage; at nine is entitled to dower; at 12 is at years of maturity, and therefore may consent or disagree to marriage, and, if proved to have sufficient discretion, may bequeath her personal estate; at 14 is at years of legal discretion, and may choose a guardian; at 17 may be executrix; and at 21 may dispose of herself and her lands. So that full age in male or female is 21 years, which age is completed on the day preceding the anniversary of a person's birth; who till that time is an infant, and so styled in law. Among the ancient Greeks and Romans, women were never of age, but subject to perpetual guardianship, unless when married, *nisi convenissent in manum viri*: and, when that perpetual tutelage wore away in process of time, we find that, in females as well as males, full age was not till 25 years. Thus by the constitution of different kingdoms, this period, which is merely arbitrary, and *juris positum*, is fixed at different times. Scotland agrees with England in this point; (both probably copying from the old Saxon constitutions on the continent, which extended the age of minority *ad annum vigintiunum primum, et eo usque juvenes sub tutelam reponunt*): but in Naples persons are of full age at 18; in France, with regard to marriage, not till 30; and in Holland at 25.

The very disabilities of infants are privileges; in order to secure them from hurting themselves by their own improvident acts. An infant cannot be sued but under the protection, and joining the name, of his guardian; for he is to defend him against all attacks as well by law as otherwise: but he may sue either by his guardian, or *prochein amy*, his next friend who is not his guardian. This *prochein amy* may be any person who will undertake the infant's cause; and it frequently happens, that an infant, by his *prochein amy*, institutes a suit in equity against a fraudulent guardian.

With regard to estates and civil property, an infant hath many privileges. In general, an infant shall lose nothing by nonclaim, or neglect of demanding his right; nor shall any other *laches* or negligence be imputed to an infant, except in some very particular cases.

It is generally true, that an infant can neither alienate his lands, nor do any legal act, nor make a deed, nor indeed any manner of contract, that will bind him. But still to all these rules there are some exceptions: part of which were just now mentioned in reckoning up the different capacities which they assume at different ages: and there are others, a few of which it may not be improper to recite, as a general specimen of the whole. And, first, it is true, that infants cannot alienate their estates: but infant-trustees, or mortgagees, are enabled to convey, under the direction of the court of chancery or exchequer, or other courts of equity, the estates they hold in trust or mortgage, to such person

as the court shall appoint. Also it is generally true, that an infant can do no legal act: yet an infant, who has an advowson, may present to the benefice when it becomes void. For the law in this case dispenses with one rule, in order to maintain others of far greater consequence: it permits an infant to present a clerk (who, if unfit, may be rejected by the bishop), rather than either suffer the church to be unserved till he comes of age, or permit the infant to be debarred of his right by lapse to the bishop. An infant may also purchase lands, but his purchase is incomplete: for, when he comes to age, he may either agree or disagree to it, as he thinks prudent or proper, without alleging any reason; and so may his heirs after him, if he dies without having completed his agreement. It is, farther, generally true, that an infant, under 21, can make no deed but what is afterwards voidable: yet in some cases he may bind himself apprentice by deed indentured or indentures, for seven years; and he may by deed or will appoint a guardian to his children, if he has any. Lastly, it is generally true, that an infant can make no other contract that will bind him: yet he may bind himself to pay for his necessary meat, drink, apparel, physic, and such other necessities; and likewise for his good teaching and instruction, whereby he may profit himself afterwards.

INFANTE, and INFANTA, all the sons and daughters of the kings of Spain and Portugal, except the eldest; the princes being called *infantes*, and the princesses *infantas*.

INFANTRY, in military affairs, the whole body of foot-soldiers, whether independent companies or regiments.—The word takes its origin from one of the *infantas* of Spain, who, finding that the army commanded by the king her father had been defeated by the Moors, assembled a body of foot-soldiers, and with them engaged and totally routed the enemy. In memory of this event, and to distinguish the foot-soldiers, who were not before held in much consideration, they received the name of *infantry*.

Heavy-armed INFANTRY, among the ancients, were such as wore a complete suit of armour, and engaged with broad shields and long spears. They were the flower and strength of the Grecian armies, and had the highest rank of military honour.

Light-Armed INFANTRY, among the ancients, were designed for skirmishes, and for fighting at a distance. Their weapons were arrows, darts, or slings.

Light INFANTRY, among the moderns, have only been in use since the year 1656. They have no camp-equipage to carry, and their arms and accoutrements are much lighter than those of the infantry. Light infantry are the eyes of a general, and the givers of sleep and safety to an army. Wherever there is found light cavalry, there should be light infantry. They should be accustomed to the pace of four miles an hour, as their usual marching pace, and to be able to march at five miles an hour upon all particular occasions. Most of the powers on the continent have light infantry.

INFATUATE, to prepossess any one in favour of some person or thing that does not deserve it, so far as that he cannot easily be disabused.—The word *infatuate* comes from the Latin *fatuus*, "fool," of *fieri*, "to speak out," which is borrowed from the Greek

Infection
||
Infinitesimals.

Infinity
||
Information.

propheta, whence *propheta*, which signifies the same with *vates* in Latin, or *prophet* in English; and the reason is, because their prophets or priests used to be seized with a kind of madness or folly, when they began to make their predictions, or deliver oracles.

The Romans called those persons *insatiati*, who fancied they had seen visions, or imagined the god Faunus, whom they called *Fatuu*, had appeared to them.

INFECTION, among physicians. See **CONTAGION**.

INFECTMENT, in Scots law, the solemnity of the delivery of an heritable subject to the purchaser.

INFIBULATION, in surgery, an operation which is the reverse of circumcision; for it confines the prepuce so over the glans penis, that it cannot be drawn back. The operation is thus performed. Extend the skin which is above the glans, and with ink mark the part on each side through which the perforation is to be made; then let it retract itself. If the marks recur upon the glans, too much of the skin hath been taken up, and the marks must be made nearer to the end of the prepuce, but only so as that they may not return upon the glans, and thus the feat of the fibula is determined. Then a needle, armed with a waxed thread, is passed through, and moved backward and forward every day, until a cicatrix is formed. After this the fibula is fixed.

Thus the ancient Romans were used to preserve their singing boys from all premature and preposterous ideal venery, and so preserve their voices longer. The fibula seems to have been a kind of ring.

INFINITE, that which has neither beginning nor end: in which sense God alone is infinite.

Infinite is also used to signify that which has had a beginning, but will have no end, as angels and human souls. This makes what the schoolmen call *infinitum a parte post*; as, on the contrary, by *infinitum a parte ante*, they mean that which has an end but had no beginning.

INFINITE Quantities. The very idea of magnitudes infinitely great, or such as exceed any assignable quantities, does include a negation of limits; yet if we nearly examine this notion, we shall find that such magnitudes are not equal among themselves, but that there are really, besides infinite length and infinite area, three several sorts of infinite solidity; all of which are *quantitates sui generis*, and that those of each species are in given proportions.

Infinite length, or a line infinitely long, is to be considered either as beginning at a point, and so infinitely extended one way, or else both ways from the same point; in which case the one, which is a beginning infinity, is the one half of the whole, which is the sum of the beginning and ceasing infinity; or, as may be said, of infinity *a parte ante* and *a parte post*, which is analogous to eternity in time and duration, in which there is always as much to follow as is past, from any point or moment of time; nor doth the addition or subtraction of finite length, or space of time, alter the case either in infinity or eternity, since both the one or the other cannot be any part of the whole.

INFINITESIMALS, among mathematicians, are denoted to be infinitely small quantities.

In the method of infinitesimals, the element, by which

any quantity increases or decreases, is supposed to be infinitely small; and is generally expressed by two or more terms, some of which are infinitely less than the rest, which being neglected as of no importance, the remaining terms form what is called the *difference of the proposed quantity*. The terms that are neglected in this manner, as infinitely less than the other terms of the element, are the very same which arise in consequence of the acceleration, or retardation, of the generating motion, during the infinitely small time in which the element is generated; so that the remaining terms express the elements that would have been produced in that time, if the generating motion had continued uniform: therefore those differences are accurately in the same ratio to each other as the generating motions or fluxions. And hence, though in this method infinitesimal parts of the elements are neglected, the conclusions are accurately true without even an infinitely small error, and agree precisely with those that are deduced by the method by fluxions.*

INFINITY. See **METAPHYSICS**, n° 66—69.

INFIRMARY, a kind of hospital, where the weak and sickly are properly taken care of.

INFLAMMABILITY, that property of bodies which disposes them to kindle or catch fire. See **FIRE**, **FLAME**, **PHLOGISTON**, &c.

INFLAMMATION, in medicine and surgery, a redness and swelling of any part of the body, attended with heat, pain, and symptoms of fever. See (the *Index* subjoined to) **MEDICINE**.

INFLAMMATION of Oils by concentrated Acids. See **CHEMISTRY**, n° 219.

INFLECTED RAYS. See **INFLECTED RAYS**.

INFLECTION, or *Point of INFLECTION*, in the higher geometry, is a point where a curve begins to bend a contrary way.

INFLECTION, in grammar, the variation of nouns and verbs, by declension and conjugation.

INFLUENCE, a quality supposed to flow from the heavenly bodies, either with their light or heat; to which astrologers idly ascribe all sublunary events.

INFORMATION, in law, is nearly the same in the crown-office, as what in other courts is called a *declaration*. See **PROSECUTION**.

Informations are of two sorts; first, those which are partly at the suit of the king, and partly at that of a subject; and secondly, such as are only in the name of the king. The former are usually brought upon penal statutes, which inflict a penalty upon conviction of the offender, one part to the use of the king, and another to the use of the informer. By the statute 31 Eliz. c. 5. no prosecution upon any penal statute, the suit and benefit whereof are limited in part to the king and in part to the prosecutor, can be brought by any common informer after one year is expired since the commission of the offence; nor on behalf of the crown, after the lapse of two years longer; nor, where the forfeiture is originally given only to the king, can such prosecution be had after the expiration of two years from the commission of the offence.

The informations that are exhibited in the name of the king alone, are also of two kinds: first, those which are truly and properly his own suits, and filed *ex officio* by his own immediate officer, the attorney-

general: secondly, those in which, though the king is the nominal prosecutor, yet it is at the relation of some private person or common informer; and they are filed by the king's coroner and attorney in the court of king's bench, usually called the *master of the crown-office*, who is for this purpose the standing officer of the public. The objects of the king's own prosecutions, filed *ex officio*, by his own attorney-general, are properly such enormous misdemeanors, as peculiarly tend to disturb or endanger his government, or to molest or affront him in the regular discharge of his royal functions. For offences so high and dangerous, in the punishing or preventing of which a moment's delay would be fatal, the law has given to the crown the power of an immediate prosecution, without waiting for any previous application to any other tribunal: which power, thus necessary, not only to the ease and safety, but even to the very existence, of the executive magistrate, was originally reserved in the great plan of the English constitution; wherein provision is wisely made for the due preservation of all its parts. The objects of the other species of informations, filed by the master of the crown-office upon the complaint or relation of a private subject, are any gross and notorious misdemeanors, riots, batteries, libels, and other immoralities of an atrocious kind, not peculiarly tending to disturb the government (for those are left to the care of the attorney-general), but which, on account of their magnitude or pernicious example, deserve the most public animadversion. And when an information is filed, either thus, or by the attorney-general *ex officio*, it must be tried by a petit jury of the county where the offence arises: after which, if the defendant be found guilty, he must resort to the court for his punishment. See a history and vindication of this made of prosecution in the work quoted on the margin, vol. iv. p. 309.—312.

INFRACTION, a term chiefly used to signify the violation of a treaty.

INFRA-SCAPULARIS, in anatomy. See **ANATOMY**, *Table of the Muscles*.

INFRA-Spinatus, in anatomy. See **ANATOMY**, *ibid*.

INFULA, in antiquity, a broad kind of fillet, made of white wool, which the priests used to tie round their heads.

INFUNDIBULIFORM, in botany, an appellation given to such monopetalous or one-leaved flowers as resemble a funnel in shape, or which have a narrow tube at one end, and gradually widen towards the limb or mouth.

INFUSION, in chemistry, taken in its most general sense, consists in placing compound bodies in a liquor intended to be impregnated with some of their principles, either without heat, or with a heat less than that of the boiling liquor.

From this definition we may see that *infusion* is one of the principal operations of the analysis by menstrua, in the same manner in which decoction is, of which *infusion* may be considered as the first degree.

Infusion may be made in watery, spirituous, oily, acid, or alkaline liquors, according to the nature of the matters to be infused, and of the principles intended to be extracted. It is nevertheless practised upon vegetable matters only; and almost always for

the preparation of remedies, which are also called *infusions*.

Aromatic plants, and other odoriferous vegetable matters, are generally infused, when their odoriferous principle is to be preserved, in which their virtue consists, and which is at the same time so volatile as to be dissipated and lost by the heat of ebullition. To preserve still better these volatile principles, the smallest heat requisite for the extraction ought to be employed; and these *infusions* ought to be made in matraffes, or other vessels, which may be exactly closed.

The principles extracted by *infusion* are different according to the menstruum employed. Pure water may be impregnated with the odoriferous principle, or *spiritus rectior*, with saline, saponaceous, mucilaginous, extractive principles. Spirit of wine dissolves the *spiritus rectior*, the essential oils, though resinous matters the base of which is an oil of the nature of essential oils, and the greatest part of the saponaceous extractive matter. Those *infusions* made by spirit of wine are particularly called *tinctures*, especially in pharmacy. Oils dissolve the *spiritus rectior*, and any oily matter. Acids and alkalis dissolve the earthy substances of vegetables, and almost all their other principles: but they disguise them, alter them, and change considerably their virtues by the combination. They are therefore not much used for these kinds of extractions.

INGELSHEIM, a town of Germany, in the palatinate of the Rhine, remarkable for having been the residence of the emperors; seated on the river Salva, on an eminence, from whence there is a charming prospect. E. Long. 8. 5. N. Lat. 49. 58.

INGENUOUS, in a general sense, signifies *open, fair, and candid*.

INGENUUS, (*ingenuus*), in Roman antiquity, an appellation given to persons born of free parents, who had never been slaves: for the children of the *liberti*, or persons who had obtained their liberty, were called *libertini*, not *ingenui*; this appellation of *ingenuus* being reserved for their children, or the third generation.

INGLUVIES, the crop or craw of granivorous birds, serving for the immediate reception of the food, where it is macerated for some time, before it is transmitted to the true stomach.

INGOLSTADT, a handsome town of Germany, and the strongest in Bavaria, with a famous university, and a handsome church. The houses are built with stone, and the streets large. It is seated on the Danube, in E. Long. 11. 10. N. Lat. 48. 42.

INGOT, a mass of gold, or silver, melted down, and cast in a mould, but not coined or wrought.

INGRAFTING, in gardening. See **GRAFTING**.

INGRESS, in astronomy, signifies the sun's entering the first scruple of one of the four cardinal signs, especially Aries.

INGRIA, a province of the Russian empire, lying on the gulph of Finland, being about 130 miles in length, and 50 in breadth. It abounds in game and fish; and here are a great number of elks, which come

Ingroff
Ingulphus.

Inhaler
Inhumation.

in troops from Finland in the spring and autumn. It was conquered by the czar Peter the Great, and Peterburgh is the capital town. It is bounded by the river Nieva, and the gulph of Finland, on the north; by Great Novogorod, on the east and south; and by Livonia, on the west.

INGROSSER, one who buys up great quantities of any commodity, before it comes to market, in order to raise the price.

INGUEN, in anatomy, the fame with what is otherwise called *groin*, or *pubes*.

INGULPHUS, abbot of Croyland, and author of the history of that abbey, was born in London about A. D. 1030. He received the first part of his education at Westminister; and when he visited his father, who belonged to the court of Edward the Confessor, he was so fortunate as to engage the attention of queen Edgitha. That amiable and learned princess took a pleasure in examining our young scholar on his progress in grammar, and in disputing with him in logic; nor did the ever dismiss him without some present as a mark of her approbation. From Westminister he went to Oxford, where he applied to the study of rhetoric, and of the Aristotelian philosophy, in which he made greater proficiency than many of his contemporaries. When he was about 21 years of age, he was introduced to William duke of Normandy, (who visited the court of England, A. D. 1051,) and made himself so agreeable to that prince, that he appointed him his secretary, and carried him with him into his own dominions. In a little time he became the prime favourite of his prince, and the dispenser of all preferments, humbling some, and exalting others, at his pleasure; in which difficult station, he confesseth, he did not behave with a proper degree of modesty and prudence. This excited the envy and hatred of many of the courtiers; to avoid the effects of which, he obtained leave from the duke to go in pilgrimage to the Holy Land, which was then become fashionable. With a company of 30 horsemen, he joined Sigfrid duke of Mentz, who, with many German nobles, bishops, clergy, and others, was preparing for a pilgrimage to Jerusalem. When they were all united, they formed a company of no fewer than 7000 pilgrims. In their way they spent some time at Constantinople, performing their devotions in the several churches. In their passage through Lycia, they were attacked by a tribe of Arabs, who killed and wounded many of them, and plundered them of a prodigious mass of money. Those who escaped from this disaster, at length reached Jerusalem, visited all the holy places, and bedewed the ruins of many churches with their tears, giving money for their reparation. They intended to have bathed in Jordan; but being prevented by the roving Arabs, they embarked on board a Genoese fleet at Joppa, and landed at Brundisium, from whence they travelled through Apulia to Rome. Having gone through a long course of devotions in this city, at the several places distinguished for their sanctity, they separated, and every one made the best of his way into his own country. When Ingulph and his company reached Normandy, they were reduced to 20 half-starved wretches, without money, cloaths, or horses: A faithful picture of the foolish disastrous journeys into the Holy Land, so common in those

times. Ingulph was now so much disgusted with the world, that he resolved to forsake it, and became a monk in the abbey of Fontenelle in Normandy; in which, after some years, he was advanced to the office of prior. When his old master was preparing for his expedition into England, A. D. 1066, he was sent by his abbot, with 100 merks in money, and 12 young men, nobly mounted and completely armed, as a present from their abbey. Ingulph having found a favourable opportunity, presented his men and money to his prince, who received him very graciously; some part of the former affection for him reviving in his bosom. In consequence of this he raised him to the government of the rich abbey of Croyland in Lincolnshire, A. D. 1076, in which he spent the last 34 years of his life, governing that society with great prudence, and protecting their possessions from the rapacity of the neighbouring barons by the favour of his royal master. The lovers of English history and antiquities are much indebted to this learned abbot, for his excellent history of the abbey of Croyland, from its foundation, A. D. 664, to A. D. 1091, into which he hath introduced much of the general history of the kingdom, with a variety of curious anecdotes that are nowhere else to be found. Ingulph died of the gout, at his abbey, A. D. 1109, in the 79th year of his age.

INHALER, in medicine, a machine for breathing in warm steams into the lungs, recommended by Mr Mudge in the cure of the catarrhus cough. The body of the instrument holds about a pint; and the handle, which is fixed to the side of it, is hollow. In the lower part of the vessel, where it is soldered to the handle, is a hole, by means of which, and three others on the upper-part of the handle, the water, when it is poured into the *inhaler*, will rise to the same level in both. To the middle of the cover a flexible tube about five or six inches long is fixed, with a mouth-piece of wood or ivory. Underneath the cover there is a valve fixed, which opens and shuts the communication between the upper and internal part of the *inhaler* and the external air. When the mouth is applied to the end of the tube in the act of inspiration, the air rushes into the handle, and up through the body of warm water, and the lungs become, consequently, filled with hot vapours. In expiration, the mouth being still fixed to the tube, the breath, together with the steam on the surface of the water in the *inhaler*, is forced up through the valve in the cover. In this manner, therefore, the whole act of respiration is performed through the *inhaler*, without the necessity, in the act of expiration, of either breathing through the nose, or removing the pipe from the mouth. See (the *Index* subjoined to) MEDICINE.

INHERITANCE, a perpetual right or interest in lands, invested in a person and his heirs. See DESCENT.

INHIBITION, in Scots law, a diligence obtained at the suit of a creditor against his debtor, prohibiting him from selling or contracting debts upon his estate to the creditor's prejudice.

INHUMATION, in chemistry, a method of digesting substances, by burying the vessel in which they are contained in horse-dung or earth.

INJECTION, the forcibly throwing certain liquid medicines into the body by means of a syringe, tube, clyster-pipe, or the like.

Anatomical Injection, the filling the vessels of a human, or other animal body, with some coloured substance, in order to make their figures and ramifications visible. The best account of the method of injecting the vessels of animals, is that by the late Dr Monro, published in the *Medial Essays*, vol. i. p. 79.

"The instrument with which the liquor is commonly thrown into the vessels is a tight easy going syringe of brass, to which several short pipes are fitted, and can be fixed by screws, the other extremities of these pipes being of different diameters without any screw, that they may slide into other pipes, which are so exactly adapted to them at one end, that when they are pressed a little together, nothing can pass between them: and because their cohesion is not so great as to resist the pushing force of the injection, which would drive off this second pipe, and spoil the whole operation; therefore the extremity of this second sort of pipes, which receives the first kind, is formed on the outside into a square, bounded behind and before by a rising circle, which hinders the key that closely grasps the square part from sliding backwards or forwards; or a bar of brass must stand out from each side of it to be held with the fingers. The other extremity of each of these second sort of pipes is of different diameter; and near it a circular notch, capable of allowing a thread to be sunk into it, is formed; by this, the thread tying the vessel at which the injection is to be made, will not be allowed to slide off.

"Besides this form described, common to all this second sort of pipes, we ought to have some of the larger ones, with an additional mechanism, for particular purposes; as, for instance, when the larger vessels are injected, the pipe fastened into the vessel ought either to have a valve or a stop-cock, that may be turned at pleasure, to hinder any thing to get out from the vessel by the pipe; otherwise, as the injection, in such a case, takes time to coagulate, the people employed in making the injection must either continue all that while in the same posture; or, if the syringe is too soon taken off, the injected liquor runs out, and the larger vessels are emptied. When the syringe is not large enough to hold at once all the liquor necessary to fill the vessels, there is a necessity of filling it again. If, in order to do this, the syringe was to be taken off from the pipe fixed in the vessel, some of the injection would be lost, and what was exposed to the air would cool and harden; therefore some of the pipes ought to have a reflected curve tube coming out of their side, with a valve so disposed, that no liquor can come from the straight pipe into the crooked one, but, on the contrary, may be allowed to pass from the crooked to the straight one: the injector then, taking care to keep the extremity of the reflected pipe immersed in the liquor to be injected, may, as soon as he has pushed out the first syringeful, fill it again by only drawing back the sucker; and, repeating this quickly, will be able to throw several syringe-fuls into the vessels.

"All these different sorts of pipes are commonly made of brass.

"The liquors thrown into the vessels with a design to fill the small capillary tubes, are either such as will incorporate with water, or such as are oily; both kinds have their advantages and inconveniences, which I shall mention in treating of each, and shall conclude with that which I have found by experience to succeed best.

"All the different kinds of glue, or ichtyocolla, syths, common glue, &c. dissolved and pretty much diluted, mix easily with the animal-fluids, which is of great advantage, and will pass into very small vessels of a well-chosen and prepared subject, and often answer the intention sufficiently, where the design is only to prepare some very fine membrane, on which no vessels can be expected to be seen so large as the eye can discover whether the transverse sections of the vessels would be circular, or if their sides are collapsed. But when the larger vessels are also to be prepared, there is a manifest disadvantage to the usefulness and beauty of the preparation; for if nothing but the glutinous liquor is injected, one cannot keep a subject so long as the glue takes of becoming firm; and therefore, in dissecting the injected part, several vessels will probably be cut and emptied. To prevent this, one may indeed either soak the part well in alcohol, which coagulates the glue; but then it becomes so brittle, that the least handling makes it crack; and if the preparation is to be kept, the larger vessels appear quite shrivelled, when the watery part of the injection is evaporated: or the efflux of the injection may be prevented, by carefully tying every vessel before we are obliged to cut it; still, however, that does not hinder the vessels to contract when the glue is drying. If, to obviate these difficulties, the glutinous liquor should first be injected in such quantity as the capillary vessels will contain, and the common oily or waxy injection is pushed in afterwards to keep the larger vessels distended, the wax is very apt to harden before it has run far enough; the two sorts of liquors never mix to mix irregularly, and the whole appears interrupted and broken by their soon separating from each other; which is still more remarkable afterwards, when the watery particles are evaporated.

"Spirits of wine coloured mixes with water and oils, and so far is proper to fill the very smaller vessels with; but, on the other hand, it coagulates any of the liquors it meets, which sometimes block up the vessels so much, that no more injection will pass; then it scarce will suspend some of the powders that prove the most durable colours; and as it entirely evaporates, the vessels must become very small; and the small quantity of powder left, having nothing to serve for connecting its particles together, generally is seen so interrupted, that the small ramifications of vessels rather have the appearances of random scratches of a pencil, than of regular continued canals.

"Melted tallow, with a little mixture of oil of turpentine, may sometimes be made to fill very small vessels, and keeps the larger ones at a full stretch; but where any quantity of the animal liquors are still in the vessels, it is liable to stop too soon, and never can be introduced into numbers of vessels which other liquors enter; and it is so brittle, that very little handling,

ling.

Injection. ling makes it crack, and thereby renders the preparation very ugly (A).

"The method I have always succeeded best with, in making what may be called *subtile* or *fine injections*, is, first to throw in coloured oil of turpentine, in such a quantity as might fill the very small vessels; and, immediately after, to push the common coarse injection into the larger ones. The oil is subtile enough to enter rather smaller capillary tubes than any colouring can; its resinous parts, which remain after the spiritous are evaporated, give a sufficient adhesion to the particles of the substance with which it is coloured, to keep them from separating, and it intimately incorporates with the coarser injection; by which, if the injection is rightly managed, it is impossible for the sharpest eye to discover that two sorts have been made use of (B).

"All the liquors with which the vessels of animals are artificially filled, having very faint, and near the same colours, would not at all appear in the very small vessels, because of their becoming entirely diaphanous, without a mixture of some substance to impart its colour to them; and where several sorts of even the larger vessels of any part were filled, one sort could not be distinguished from another, unless the colour of each was different; which has likewise a good effect in making preparations more beautiful. Wherefore anatomists have made use of a variety of such substances, according to their different fancies or intentions; such as gamboge, saffron, ink, burnt ivory, &c. which can be easily procured from painters. My design being only to consider those that are fit to be mixed with the injecting liquors proposed to fill capillary vessels, which is scarce ever to be done in any other, except the branches of the arteries and of some veins, I shall confine myself to the common colours employed to these last named two sorts of vessels, which colours are red, green, and sometimes blue, without mentioning the others which require very little choice.

"Anatomists have, I imagine, proposed to imitate the natural colours of the arteries and veins in a living creature, by filling the arteries with a red substance, and the veins with a blue or green: from which, however, there are other advantages, such as the strong reflection which such bodies make of the rays of light, and the unaptness most such bodies have to transmit these same rays, without at least a considerable reflection of the rays peculiar to themselves; or, in other words, their unfitness to become completely pellucid; without which, the very fine vessels, after being injected, would still be imperceptible. The animal or vegetable substances made use of for colouring injections, such as cochineal, laque, *rad. anchuse*, brazil-wood, indigo, &c. have all one general fault of being liable to run into little knots which stop some of the vessels; their colour fades sooner when kept dry; they more easily yield their tincture when the parts are preserved in a liquor; and rats, mice, and insects, will take

them for food: for which reasons, though I have frequently succeeded in injecting them, I rather prefer the mineral kind, such as minium or vermilion for red; of which this last is, in my opinion, the best, because it gives the brightest colour, and is commonly to be bought finely levigated. The green-coloured powder generally used is verdigrease; but I rather chuse that preparation of it called *distilled verdigrease*, because its colour is brighter, and it does not so often run into small knots as the common verdigrease, but dissolves in the oily liquors.

"The method of preparing the injection composed of these materials, is to take, for the fine one, a pound of clear oil of turpentine, which is gradually poured on three ounces of vermilion, or distilled verdigrease finely powdered, or rather well levigated by grinding on marble; stir them well with a small wooden spatula till they are exactly mixed, then strain all through a fine linen rag. The separation of the grosser particles is, however, rather better made, by pouring some ounces of the oil upon the powder, and, after stirring them together strongly, stop rubbing with the spatula for a second or so, and pour off into a clean vessel the oil with the vermilion or verdigrease suspended in it; and continue this sort of operation till you observe no more of the powder come off; and all that remains is granulated. The coarser injection is thus prepared: Take tallow, 1 pound; wax, bleached white, 5 ounces; salad oil, 3 ounces; melt them in a skillet put over a lamp; then add Venice turpentine, 2 ounces; and as soon as this is dissolved, gradually sprinkle in of vermilion or verdigrease prepared, 3 ounces; then pass all through a clean, dry, warmed linen-cloth, to separate all the grosser particles; and, when you design to make it run far into the vessels, some oil of turpentine may be added immediately before it is used.

"The next thing to be considered, and indeed what chiefly contributes to the success of injections, is the choice and preparation of the subject whose vessels are to be filled.

"In chusing a fit subject, take these few general rules: 1. The younger the creature to be injected is, the injection will, *ceteris paribus*, go farthest, and *vice versa*. 2. The more the creature's fluids have been dissolved and exhausted in life, the success of the operation will be greater. 3. The less solid the part designed to be injected is, the more vessels will be filled. 4. The more membranous and transparent parts are, the injection shows better; whereas, in the solid very hard parts of a rigid old creature, that has died with its vessels full of thick strong blood, it is scarce possible to inject great numbers of small vessels.

"Therefore, in preparing a subject for injecting, the principal things to be aimed at are, To dissolve the fluids, empty the vessels of them, relax the solids, and prevent the injection's coagulating too soon. To an-

(A) Rigierus (*introduc. in notitiam rerum natur.* &c. 4to, Hagae, 1743, titul. *Balsamum*) gives Ruysch's method of injecting and preserving animals, which, he says, Mr Blumentrost, president of the Petersburg academy, assured him was copied from the receipt given in Ruysch's own hand-writing to the Czar. According to this receipt, melted tallow, coloured with vermilion, to which, in the summer, a little white wax was added, was Ruysch's injecting *ceracea materies*.

(B) Mr Ranby's injecting matter, as published by Dr Hales, (*Hæmaph. Ex. 21.*), is white rosin and tallow, of each two ounces, melted and strained through linen; to which was added three ounces of vermilion, or finely ground indigo, which was first well rubbed with eight ounces of turpentine varnish.

answer all these intentions, authors have proposed to inject tepid or warm water by the arteries, till it returns clear and untinted by the veins, and the vessels are thereby so emptied of blood, that all the parts appear white; after which, they push out the water by forcing in air; and, lastly, by pressing with their hands, they squeeze the air also out. After this preparation, one can indeed inject very subtly; but generally there are inconveniencies attend it. For in all the parts where there is a remarkable *tunica cellulosa*, it never misses to be full of the water, which is apt to spoil any parts designed to be preserved either wet or dry; and some particles of the water seldom miss to be mixed in the larger as well as smaller vessels with the oily injection, and make it appear discontinued and broken: wherefore it is much better to let this injection of water alone, if it can be possibly avoided, and rather to macerate the body or part to be injected a considerable time in water, made so warm (c) as one can hold his hand easily in it; taking care to keep it of an equal warmth all the time, by taking out some of the water as it cools, and pouring in hot water in its place; by which the vessels will be sufficiently softened and relaxed, the blood will be melted down, and the injection can be in no danger of hardening too soon; whereas, if the water is too hot, the vessels shrink, and the blood coagulates. From time to time we squeeze out the liquids as much as possible at the cut vessel by which the injection is to be thrown in (d). The time this maceration is to be continued, is always in proportion to the age of the subject, the bulk and thickness of what we design to inject, and the quantity of blood we observe in the vessels, which can only be learned by experience; at least, however, care ought to be taken, that the whole subject, or part macerated, is perfectly well warmed all through; and that we continue the pressure with our hands, till no more blood can be brought away, whatever position we put the subject in.

When the syringe, injections, and subject, are all in readiness, one of the second sort of pipes is chosen, as near to the diameter of the vessel by which the injection is to be thrown as possible; for if the pipe is too large, it is almost needless to tell it cannot be introduced. If the pipe is much smaller than the vessel, it is scarce possible to tie them so firmly together, but, by the wrinkling of the coats of the vessel, some small passage will be left, by which part of the injection will spring back on the injector, in the time of the operation, and the nearest vessels remain afterwards undistended, by the loss of the quantity that oozes out. Having chosen a fit pipe, it is introduced at the cut orifice of the vessel, or at an incision made in the side of it; and then a waxed thread being brought round the vessel, as near to its coats as possible, by the help of a needle, or a flexible eyed probe, the surgeon's knot is made with the thread, and it is drawn as firmly as the thread can allow; taking care that it

shall be sunk into the circular notch of the pipe all round, otherwise it will very easily slide off, and the pipe will be brought out probably in the time of the operation, which ruins it.

"If there have been large vessels cut, which communicate with the vessels you design to inject, or if there are any others proceeding from the same trunk, which you do not resolve to fill, let them be all carefully now tied up, to save the injected liquor, and make the operation succeed better in the view you then have."

"When all this is done, both sorts of injections are to be warmed over a lamp, taking care to stir them constantly, lest the colouring powder fall to the bottom and burn (e). The oil of turpentine needs be made no warmer than will allow the finger to remain in it, if the subject has been previously well warmed in water; when the maceration has not been made, the oil ought to be scalding hot, that it may warm all the parts which are designed to be injected. The coarse injection ought to be brought near to a boiling. In the mean time, having wrapt several folds of linen round the parts of the syringe which the operator is to grip, and secured the linen with thread, the syringe is to be made very hot by sucking boiling water several times up (f), and the pipe within the vessel is to be warmed by applying a sponge dipped in boiling water to it (g).

"After all is ready, the syringe being cleared of the water, the injector fills it with the finer injection; and then introducing the pipe of the syringe into that in the vessel, he presses them together, and either with one hand holds this last pipe firm, with the other grips the syringe, and with his breast pushes the sucker; or, giving the pipe in the vessel to be held by an assistant, in any of the ways mentioned in the description of these sorts of pipes, he grips the syringe with one hand, and pushes the sucker with the other, and consequently throws in the injection, which ought to be done slowly, and with no great force, but proportioned to the length and bulk of the part to be injected and strength of the vessels. The quantity of this fine injection to be thrown in is much to be learned by use. The only rule I could ever fix to myself in this matter, was to continue pushing till I was sensible of a stop which would require a considerable force to overcome. But this will not hold where all the branches of any vessel are not injected; as for instance, when the vessels of the thorax only are to be injected: for the aorta bears too great a proportion to the branches sent from it, and therefore less fine injection is requisite here. As soon as that stop is felt, the sucker of the syringe is to be drawn back, that the nearest large vessels may be emptied. Then the syringe is taken off, emptied of the fine injection, and filled with the coarser, which is to be pushed into the vessels quickly and forcibly, having always regard to the strength and firmness of the vessels, bulk, &c. of the part. Continue to thrust the sucker, till a full stop, or a sort of push back-

wards,

(c) Ruysch orders a previous maceration for a day or two in cold water; which must have a better effect in melting the blood than warm water has.

(d) When Ruysch intended to inject the whole body, he put one pipe upwards, and another downwards, in the descending aorta.

(e) Ruysch melts his tallow by the heat of warm water, into which he puts the vessel containing the injection.

(f) He warms his syringe by laying it on hot coals.

(g) He warms his pipe, by putting the body, after the pipe is fixed in the vessel, into hot water. When this is to be done, a cork ought to be put into the pipe, to prevent the water getting into the vessel that is to be injected.

wards is felt, when you must beware of thrusting any more, otherwise some of the vessels will be burst, and the whole, or a considerable share of the preparation you designed, will be spoiled by the extravasation; but rather immediately stop the pipe by the turn-cock, and take out the syringe to clean it, and allow sufficient time for the coarse injection to coagulate fully, before any part is dissected. Ruysch, immediately after throwing in the injection, put the body into cold water, and stirred it continually for some time, to prevent the vermilion to separate from the tallow.

INJURY, any wrong done to a man's person, reputation, or goods. See ASSAULT.

INK, a black liquor used in writing, generally made of an infusion of galls, copperas, and gum-arabic.

The properties which this liquid ought to have, are,
1. To flow freely from the pen, and sink a little into the paper, that the writing be not easily discharged.
2. A very deep black colour, which should be as deep at first as at any time afterwards.
3. Durability, so that the writing may not be subject to decay by age.
4. Ink should be destitute of any corrosive quality, that it may not destroy the paper, or go through it in such a manner as to render the writing illegible. No kind of ink, however, hath yet appeared which is possessed of all these qualities. The ink used by the ancients was possessed of the second, third, and fourth qualities above-mentioned, but wanted the first. Dr Lewis hath discovered its composition from some passages in ancient authors. "Pliny and Vitruvius, (says he), expressly mention the preparation of foot, or what we now call *lamp-black*, and the composition of writing-ink from lamp-black and gum. Dioscorides is more particular, setting down the proportions of the two ingredients, viz. three ounces of the foot to one of the gum. It seems the mixture was formed into cakes or rolls; which being dried in the sun, were occasionally tempered with water, as the cakes of Indian ink are among us for painting."

In Mr Delaval's Treatise on Colours, p. 37. he acquaints us, that with an infusion of galls and iron filings, he had not only made an exceedingly black and durable ink, but by its means, without the addition of any acid, dyed silk and woollen cloth of a good and lasting black. This kind of ink, however, tho' the colour is far superior to that of any other, hath the inconvenience of being very easily discharged, either by the smallest quantity of any acid, or even by simple water; because it doth not penetrate the paper in such a manner as is necessary to preserve it from the instantaneous action of the acid or of the water. During the action of the infusion of galls upon the iron in making this kind of ink, a very considerable effervescence takes place, and a quantity of air is discharged, the nature of which hath not yet been examined.

The materials usually employed for the making of ink are, common green vitriol, or copperas, and galls; but almost all of them are deficient in durability, which is a property of such importance, that Dr Lewis hath thought the subject of ink-making not unworthy of his attention. From experiments made by that author, he infers, that the decay of ink is chiefly owing to a deficiency of galls; that the galls are the most perish-

able ingredient, the quantity of these, which gives the greatest blackness at first, (which is about equal parts with the vitriol), being insufficient to maintain the colour: that for a durable ink, the quantity of galls cannot be much less than three times that of the vitriol; that it cannot be much greater, without lessening the blackness of the ink: that by diminishing the quantity of water, the ink was rendered blacker and more durable; that distilled water, rain water, and hard spring-water, had the same effects: that white-wine produced a deeper black colour than water; that the colour produced by vinegar was deeper than that by wine; that proof-spirit extracted only a reddish brown tinge: that the last-mentioned tincture sunk into, and spread upon, the paper; and hence the impropriety of adding spirit of wine to ink, as is frequently directed, to prevent mouldiness or freezing: that other astringents, as oak-bark, bistort, sloe-bark, &c. were not so effectual as galls, nor gave so good a black; the colour produced by most of these, excepting oak-bark, being greenish: that the juice of sloes did not produce a black colour with martial vitriol; but that, nevertheless, the writing made with it became black, and was found to be more durable than common ink: that inks made with saturated solutions of iron in nitrous, marine, or acetic acids, in tartar, or in lemon-juice, were much inferior to the ink made with martial vitriol: that the colour of ink was depraved by adding quicklime, which was done with an intention of destroying any superabundant acid which might be supposed to be the cause of the loss of the colour of ink: that the best method of preventing the effects of this superabundant acid is probably by adding pieces of iron to engage it; and that this conjecture was confirmed by an instance the author had heard, of the great durability of the colour of an ink in which pieces of iron had been long immerged: and lastly, that a decoction of logwood used instead of water, sensibly improved both the beauty and deepness of the black, without disposing it to fade. The same author observes, that the addition of gum-arabic is not only useful, by keeping the colouring matter suspended in the fluid, but also by preventing the ink from spreading, by which means a greater quantity of it is collected on each stroke of the pen. Sugar, which is sometimes added to ink, was found to be much less effectual than gums, and to have the inconvenience of preventing the drying of the ink. The colour of ink is found to be greatly injured by keeping the ink in vessels made of copper or of lead, and probably of any other metal, excepting iron, which the vitriolic acid can dissolve.

The foregoing experiments point out for the best proportions of the ingredients for ink, One part of green vitriol, one part of powdered logwood, and three parts of powdered galls. The best menstruum appears to be vinegar or white-wine, though for common use water is sufficient. If the ink be required to be of a full colour, a quart, or at most three pints, of liquor, may be allowed to three ounces of galls, and to one ounce of each of the other two ingredients. Half an ounce of gum may be added to each pint of the liquor. The ingredients may be all put together at once in a convenient vessel, and well shaken four or five times each day. In 10 or 12 days the ink will be fit for use, though it will improve by

remaining longer on the ingredients. Or it may be made more expeditiously, by adding the gum and vitriol to a decoction of galls and logwood in the menstrum. To the ink, after it has been separated from the feculencies, some coarse powder of galls, from which the fine dust has been sifted, together with one or two pieces of iron, may be added, by which its durability will be secured.

In some attempts made by the Doctor to endow writing ink with the great durability of that of the ancients, as well as the properties which it hath at present, he first thought of using animal-glues, and then of oily matters. "I mixed both lamp-black (says he) and ivory-black with solution of gum arabic, made of such consistence as just to flow sufficiently from the pen. The liquors wrote of a fine black colour; but when dry, part of the colour could be rubbed off, especially in moist weather, and a pencil dipped in water washed it away entirely.

"I tried solutions of the animal-glues, with the same effect. Isinglass or fish-glue being the most difficultly dissoluble of these kinds of bodies, I made a decoction of it in water, of such strength, that the liquor concreted into a jelly before it was quite cold: with this jelly, kept fluid by sufficient heat, I mixed some ivory-black: characters drawn with this mixture on paper bore rubbing much better than the others, but were discharged without much difficulty by a wet pencil.

"It was now suspected, that the colour could not be sufficiently fixed on paper without an oily cement. As oils themselves are made miscible with watery fluids by the intervention of gum, I mixed some of the softer printers varnish, after-mentioned, with about half its weight of a thick mucilage of gum arabic, working them well together in a mortar, till they united into a smooth uniform mass: this was beaten with lamp-black, and some water added by little and little, the rubbing being continued till the mixture was diluted to a due consistence for writing. It wrote freely, and of a full brownish-black colour: the characters could not be discharged by rubbing, but water washed them out, though not near so readily as any of the foregoing. Instead of the printers varnish or boiled oil, I mixed raw linseed oil in the same manner with mucilage and lamp-black; and on diluting the mixture with water, obtained an ink not greatly different from the other.

"Though these oily mixtures answered better than those with simple gums or glues, it was apprehended that their being dischargeable by water would render them unfit for the purposes intended. The only way of obviating this imperfection appeared to be, by using a paper which should admit the black liquid to sink a little into its substance. Accordingly I took some of the more sinking kinds of paper, and common paper made damp as for printing; and had the satisfaction to find, that neither the oily nor the simple gummy mixtures spread upon them so much as might have been expected, and that the characters were as fixed as could be desired, for they could not be washed out without rubbing off part of the substance of the paper itself.

"All these inks must be now and then stirred or shaken during the time of use, to mix up the black powder, which settles by degrees to the bottom: those

Vol. V.

with oil must be well shaken also, though not used, once a-day, or at least once in three or four days, to keep the oil united with the water and gum; for if once the oil separates, which it is apt to do by standing at rest for some days, it can no longer be mixed with the thin fluid by any agitation. But though this imperfect union of the ingredients renders these inks less fit for general use than those commonly employed, I apprehend there are many occasions in which these kinds of inconveniences will not be thought to counterbalance the advantage of having writings which we may be assured will be as lasting as the paper they are written upon. And indeed the inconvenience may be in a great measure obviated by using cotton in the ink-stand, which, imbibing the fluid, prevents the separation of the black powder diffused through it.

"All the inks, however, made on the principle we are now speaking of, can be discharged by washing, unless the paper admits them to sink into its substance. The ancients were not insensible of this imperfection; and sometimes endeavoured to obviate it, according to Pliny, by using vinegar, instead of water, for tempering the mixture of lamp-black and gum. I tried vinegar, and found it to be of some advantage, not as giving any improvement to the cement, but by promoting the sinking of the matter into the paper. As this washing out of the ink may be prevented, by using a kind of paper easy enough to be procured, it is scarcely to be considered as an imperfection; and indeed, on other kinds of paper, it is an imperfection only so far as it may give occasion to fraud, for none of these inks are in danger of being otherwise discharged than by design. The vitriolic inks themselves, and those of printed books and copperplates, are all dischargeable; nor can it be expected of the ink-maker to render writings secure from frauds.

"But a further improvement may yet be made, namely, that of uniting the ancient and modern inks together; or using the common vitriolic ink instead of water, for tempering the ancient mixture of gum and lamp-black. By this method it should seem that the writings would have all the durability of those of former times, with all the advantage that results from the vitriolic ink fixing itself in the paper. Even where the common vitriolic mixture is depended on for the ink, it may in many cases be improved by a small addition of the ancient composition, or of the common Indian ink which answers the same purpose: when the vitriolic ink is dilute, and flows so pale from the pen, that the fine strokes, on first writing, are scarcely visible, the addition of a little Indian ink is the readiest means of giving it the due blackness. By this admixture it may be presumed also that the vitriolic ink will be made more durable, the Indian ink in some measure covering it, and defending it from the action of the air. In all cases, where Indian ink or other similar compositions are employed, cotton should be used in the ink-stand, as already mentioned, to prevent the settling of the black powder."

Indian Ink, a valuable black for water-colours, brought from China and other parts of the East Indies, sometimes in large rolls, but more commonly in small quadrangular cakes, and generally marked with Chinese characters. Dr Lewis, from experiments made on this substance, hath shewn that it is composed

Ink.

of fine lamp-black and animal-glue : and accordingly, for the preparation of it, he defires us to mix the lamp-black with as much melted glue as is sufficient to give it a tenacity proper for being made into cakes ; and these when dry, he tells us, answered as well as those imported from the East Indies, both with regard to the colour, and the freedom of working. Ivory-black, and other charcoal-blacks, levigated to a great degree of fineness, answered as well as the lamp-black ; but in the state in which ivory-black is commonly sold, it proved much too gritty, and separated too hastily from the water.

Printing Ink, is totally different from Indian ink, or that made use of in writing. It is an oily composition, of the confidence of an ointment : the method of preparing it was long kept a secret by those whose employment it was to make it, and who were interested in concealing it ; and even yet is but imperfectly known. The properties of good printing-ink are, to work clean and easily, without daubing the types, or tearing the paper ; to have a fine black colour ; to wash easily off the types ; to dry soon ; and to preserve its colour, without turning brown. This last, which is a most necessary property, is effectually obtained by setting fire to the oil with which the printing ink is made for a few moments, and then extinguishing it by covering the vessel (A). It is made to wash easily off the types, by using soap as an ingredient ; and its working clean depends on its having a proper degree of strength, which is given by a certain addition of rosin. A good deal, however, depends on the proportion of the ingredients to each other ; for if too much soap is added, the ink will work very foul, and daub the types to a great degree. The same thing will happen from using too much black, at the same time that both the soap and black hinder the ink from drying ; while too much oil and rosin tear the paper, and hinder it from washing off.—The following receipt has been found to make printing ink of a tolerable good quality. “ Take a Scots pint of linseed oil, and let it over a pretty brisk fire in an iron or copper vessel capable of holding three or four times as much. When it boils strongly, and emits a thick smoke, kindle it with a piece of paper, and immediately take the vessel off the fire. Let the oil burn for about a minute ; then extinguish it by covering the vessel ; after it has grown pretty cool, add two pounds of black rosin, and one pound of hard soap cut into thin slices. If the oil is very hot when the soap is added, almost the whole mixture will run over the vessel. The mixture is then to be set again over the fire ; and when the ingredients are thoroughly melted, a pound of lamp-black, previously put through a lawn sieve, is to be stirred into it. The whole ought then to be ground on a marble stone, or in a mill like the levigating mill described under the article *CHEMISTRY*, n° 97.”

Though the above receipt is greatly superior to any that hath been hitherto published, all of which are capitally deficient in not mentioning the necessary ingredients of rosin and soap ; yet it must be acknowledged, that ink made in this manner is inferior in point of colour, and is likewise more apt to daub the types and make an indistinct impression, than such

Ink.

as is prepared by some of those who make the manufacture of this commodity their employment ; so that either a variation in the proportion of the ingredients, a nicety in the mixture, or some additional ingredient, seems necessary to bring it to the requisite perfection.

Ink for the Rolling Press, is made of linseed oil burnt in the same manner as that for common printing-ink, and then mixed with Francfort-black, and finely ground. There are no certain proportions which can be determined in this kind of ink ; every workman adding oil or black to his ink, as he thinks proper, in order to make it suit his own taste.—Some, however, mix a portion of common boiled oil which has never been burnt : but this must necessarily be a bad practice, as such oil is apt to go through the paper ; a fault very common in prints, especially if the paper is not very thick. No soap is added ; because the ink is not cleared off from the copperplates with alkaline ley as in common printing, but with a brush dipped in oil.

INK is also an appellation given to any coloured liquor used in writing, whether red, yellow, green, &c. Many different kinds of these inks may be prepared by the directions given under the article *COLOUR-MAKING*, which it would be superfluous here to repeat.

Sympathetic Ink, a liquor with which a person may write, and yet nothing appear on the paper after it is dry, till some other means are used, such as holding the paper to the fire, rubbing it over with some other liquor, &c.

These kinds of ink may be divided into seven classes, and that with respect to the means used to make them visible ; viz. 1. Such as become invisible by passing another liquor over them, or by exposing them to the vapour of that liquor. 2. Those that do not appear so long as they are kept close, but soon become visible on being exposed to the air. 3. Such as appear by stirring or sifting some very fine powder of any colour over them. 4. Those which become visible by being exposed to the fire. 5. Such as become visible by heat, but disappear again by cold or the moisture of the air. 6. Those which become visible by being wetted with water. 7. Such as appear of various colours, red, yellow, blue, &c.

I. The first class contains four kinds of ink, viz. solutions of lead, bismuth, gold, and green vitriol. The first two become visible in the same manner, viz. by the contact of sulphureous liquids or fumes. For the first, a solution of common sugar-of-lead in water will answer as well as more troublesome preparations. If you write with this solution with a clean pen, the writing when dry will be totally invisible : but if it be wetted with a solution of *hepar sulphuris*, or of orpiment, dissolved by means of quick-lime ; or if it be exposed to the strong vapours of these solutions, but especially to the vapour of volatile tincture of sulphur ; the writing will appear of a brown colour, more or less deep according to the strength of the sulphureous fume. By the same means, what is wrote with the solution of bismuth in spirit of nitre will appear of a deep black.

The sympathetic ink prepared from gold, depends on

(A) This is mentioned by Dr Lewis in his *Philosophical Commerce of Arts* ; but he seems not to have been acquainted with the method of giving it the other necessary properties.

Ink. on the property by which that metal precipitates from its solvent on the addition of a solution of tin. If you write with a solution of gold in *aqua regia*, and let the paper dry gently in the shade, nothing will appear for the first seven or eight hours. Dip a pencil or a small fine sponge in the solution of tin, and drawing it lightly over the invisible characters, they will immediately appear, of a purple colour.

Characters wrote with a solution of green vitriol carefully deperated, will likewise be invisible when the paper is dry; but if wetted with an infusion of galls, they will immediately appear as if wrote with common ink. If, instead of this infusion, a solution of the phlogisticated alkali, impregnated with the colouring matter Prussian blue is made up of, the writing will appear of a very deep blue.

II. To the second class belong the solutions of all those metals which are apt to attract phlogiston from the air, such as lead, bismuth, silver, &c. The sympathetic ink of gold already mentioned belongs also to this class; for if the characters wrote with it are long exposed to the air, they become by degrees of a deep violet colour, nearly approaching to black. In like manner, characters wrote with a solution of silver in *aqua fortis* are invisible when newly dried, but being exposed to the sun, appear of a grey colour like slate. To this class also belong solutions of lead in vinegar; copper in *aqua fortis*; tin in *aqua regia*; emery, and some kinds of pyrites, in spirit of salt; mercury, in *aqua fortis*; or iron, in vinegar. Each of these has a particular colour when exposed to the air; but they have the disfigureable property of corroding the paper, so that after some time the characters appear like holes cut out of the paper.

III. The third class of sympathetic inks contains such liquids as have some kind of glutinous viscosity, and at the same time are long a drying; by which means, though the eye cannot discern the characters wrote with them upon paper, the powders strewn upon them immediately adhere, and thus make the writing become visible. Of this kind are urine, milk, the juices of some vegetables, weak solutions of the deliquescent salts, &c.

IV. This class, comprehending all those that become visible by being exposed to the fire, is very extensive, as it contains all those colourless liquids in which the matter dissolved is capable of being reduced, or of reducing the paper, into a sort of charcoal by a small heat. A very easily procured ink of this kind is oil of vitriol diluted with as much water as will prevent it from corroding the paper. Letters wrote with this fluid are perfectly invisible when dry, but instantly appear as black as if wrote with the finest ink on being held near the fire. Juice of lemons or onions, a solution of sal-ammoniac, green vitriol, &c. will answer the same purpose, though not so easily, or with so little heat.

V. The fifth class comprehends only solutions of Regulus of Cobalt in spirit of salt; for the properties of which, see CHEMISTRY, n° 259.

VI. This class comprehends such inks as become visible when characters wrote with them are wetted with water. They are made of all such substances as deposit a copious sediment when mixed with water, dissolving only imperfectly in that fluid. Of this kind

are dried alum, sugar-of-lead, vitriol, &c. We have therefore only to write with a strong solution of these salts upon paper, and the characters will be invisible when dry; but when we apply water, the small portion of dried salt cannot again be dissolved in the water. Hence the insoluble part becomes visible on the paper, and shews the characters wrote in white, grey, brown, or any other colour which the precipitate assumes.

VII. Characters may be made to appear of a fine crimson, purple, or yellow, by writing on paper with solution of tin in *aqua regia*, and then passing over it a pencil dipt in a decoction of cochineal, Brazil-wood, logwood, yellow-wood, &c.—For an account of the nature of all these sympathetic inks, however, and the principles on which they are made, see the articles CHEMISTRY and COLOUR-MAKING, *passim*.

INLAND, a name for any part of a country at a distance from the sea.

INLAND Navigation. See CANAL.

INLAND Trade, that kind of trade carried on between the different parts of the same kingdom, whether over land, or by means of inland navigation.

INN, a place appointed for the entertainment and relief of travellers.

Inns are licensed and regulated by justices of the peace, who oblige the landlord to enter into recognizances for keeping good order. If a person who keeps a common inn, refuses to receive a traveller into his house as a guest, or to find him victuals and lodging on his tendering a reasonable price for them, he is liable to an action of damages, and may be indicted and fined at the king's suit. The rates of all commodities sold by inn-keepers, according to our ancient laws, may be assailed: and inn-keepers not selling their hay, oats, beans, &c. and all manner of victuals at reasonable prices, without taking any thing for litter, may be fined and imprisoned, &c. by 21 Jac. I. c. 21. Where an inn-keeper harbours thieves, persons of infamous character, or suffers any disorders in his house, or sets up a new inn where there is no need of one, to the hindrance of ancient and well-governed inns, he is indictable and fineable; and by statute, such inn may be suppressed. Action upon the case lies against any inn-keeper, if a theft be committed on his guest by a servant of the inn, or any other person not belonging to the guest; though it is otherwise where the guest is not a traveller, but one of the same town or village, for there the inn-keeper is not chargeable; nor is the master of a private tavern answerable for a robbery committed on his guest: it is said, that even tho' the travelling guest does not deliver his goods, &c. into the inn-keeper's possession, yet if they are stolen, he is chargeable. An inn-keeper is not answerable for any thing out of his inn, but only for such as are within it; yet, where he of his own accord puts the guest's horse to graze, and the horse is stolen, he is answerable, he not having the guest's orders for putting such horse to graze. The inn-keeper may justify the stopping of the horse, or other thing of his guest, for his reckoning, and may detain the same till it be paid. Where a person brings his horse to an inn, and leaves him in the stable, the inn-keeper may detain him till such time as the owner pays for his keeping; and

Inland,
Inn.

Black.
Common.

Innate
|
Innocent's.

and if the horse eats out as much as he is worth, after a reasonable appraisement made, he may sell the horse and pay himself: but when a guest brings several horses to an inn, and afterwards takes them all away except one, this horse so left may not be sold for payment of the debt for the others; for every horse is to be sold, only to make satisfaction for what is due for his own meat.

INNS of Court, are colleges in London, for the study of the laws of England, with all conveniencies for the lodging and entertainment of the professors and students.

In these colleges, there are not only such students as study the laws of this kingdom, in order to render themselves capable of practising in the courts of law at Westminster; but also such other gentlemen of fortune as apply themselves to this study, in order to know and vindicate their rights, and to render themselves more serviceable to their country.

Our inns of court, which are numerous, and justly famed for the production of men of learning, are governed by masters, principals, benchers, stewards, and other officers; and have public halls for exercises, readings, &c. which the students are obliged to attend and perform for a certain number of years, before they can be admitted to plead at the bar. These societies have not, however, any judicial authority over their members; but instead of this, they have certain orders among themselves, which have, by consent, the force of laws: for lighter offences, persons are only *excommunicated*, or put out of commons; for greater, they lose their chambers, and are expelled the college: and when once expelled out of one society, they are never received by any of the others. The gentlemen in these societies may be divided into benchers, outer-barristers, inner-barristers, and students.

The four principal inns of court are the Inner-temple, Middle-temple, Lincoln's-inn, and Gray's-inn; the other inns are the two Serjeant's-inns; and the others, which are less considerable, are Clifford's-inn, Symond's-inn, Clement's-inn, Lion's-inn, Furnival's-inn, Staple's-inn, Thavie's-inn, Barnard's-inn, and New-inn. These are mostly taken up by attorneys, solicitors, &c.; but they belong to the inns of court, who send yearly some of their barristers to read to them.

INNATE IDEAS, those supposed to be stamped on the mind, from the first moment of its existence, and which it constantly brings into the world with it: a doctrine which Mr Locke has taken great pains to refute.

INNERKEITHING. See **INVERKEITHING**.

INNERLOCHY, or **FORT-WILLIAM**, a fortress lately erected in the Highlands of Scotland, at the mouth of a large lake in the county of Lochaber, 28 miles S. W. of Lochness, and 100 N. W. of Edinburgh. W. Long. 5. 15. N. Lat. 56. 55.

INNISKILLING, a strong town of Ireland, in the county of Fermanagh, and province of Ulster. The inhabitants distinguished themselves in favour of king William soon after the revolution, against king James's party. It is seated between two lakes, in W. Long. 5. 50. N. Lat. 54. 20.

INNOCENT'S DAY, a festival of the Christian church, observed on December 28th, in memory of

the massacre of the innocent children by the command of Herod king of Judaea. See *JESUS CHRIST*; and *Jews*, n° 24. par. ult. The Greek church in their kalendar, and the Abyssinians of Ethiopia in their offices, commemorate 14,000 infants on this occasion.

INNOMINATA OSSA, in anatomy. See there, n° 38. a, b.

INOCULATION, or **BUDDING**, in gardening, is commonly practised upon all sorts of stone-fruit; as nectarines, peaches, apricots, plumbs, cherries, as also upon oranges and jasmines: and indeed this is preferable to any sort of grafting for most sorts of fruit. The method of performing it is as follows: You must be provided with a sharp pen-knife with a flat haft, which is to raise the bark of the stock to admit the bud; and some found bafs-mat, which should be soaked in water, to increase its strength, and render it more pliable: then having taken off the cuttings from the trees you would propagate, you must choose a smooth part of the stock, about five or six inches above the surface of the ground, if designed for dwarfs; but if for standards, they should be budded six feet above-ground. Then with your knife make an horizontal cut across the rind of the stock, and from the middle of that cut make a slit downwards, two inches in length, that it may be in the form of a T; but you must be careful not to cut too deep, lest you wound the stock: then having cut off the leaf from the bud, leaving the foot-stalk remaining, you should make a cross cut, about half an inch below the eye, and with your knife slit off the bud, with part of the wood to it: this done, you must with your knife pull off that part of the wood which was taken with the bud, observing whether the eye of the bud be left to it or not; for all those buds which lose their eyes in stripping, are good for nothing: then having gently raised the bark of the stock with the flat haft of your pen-knife clear to the wood, thrust the bud therein, observing to place it smooth between the rind and wood of the stock, cutting off any part of the rind belonging to the bud, that may be too long for the slit made in the stock; and so having exactly fitted the bud to the stock, tie them closely round with bafs-mat, beginning at the under-part of the slit, and so proceeding to the top, taking care not to bind round the eye of the bud, which should be left open.

When your buds have been inoculated three weeks or a month, those which are fresh and plump you may be sure are joined; and at this time you should loosen the bandage, which if it be not done in time, will injure if not destroy the bud. The March following cut off the stock sloping, about three inches above the bud, and to what is left fasten the shoot which proceeds from the bud: but this must continue no longer than one year; after which the stock must be cut off close above the bud. The time for inoculating is from the middle of June to the middle of August: but the most general rule is, when you observe the buds formed at the extremity of the same year's shoot, which is a sign of their having finished their spring growth. The first sort commonly inoculated is the apricot; and the last the orange-tree, which should never be done till the latter end of August. And in doing this work, you should always make choice of cloudy weather; for if it be done in the middle of the day,

Innominate,
Inoculation.

day, when the weather is hot, the shoots will perish so fast, as to leave the buds destitute of moisture.

INOCULATION, in medicine, the art of transplanting the small-pox from one person to another, by impregnating the blood of the sound person with the various matter from a pustule taken from the other. See (the *INDEX* subjoined to) **MEDICINE**.

INOSULATION, in anatomy. See **ANASTOMOSIS**.

IMPROMPTU, or **IMPROMPTU**. See **IMPROMPTU**.

INQUEST, in Scots law, the same with **JURY**.

INQUISITION, in the church of Rome, a tribunal in several Roman Catholic countries, erected by the popes for the examination and punishment of heretics.

This court was founded in the twelfth century by father Dominic and his followers, who were sent by pope Innocent III. with orders to excite the Catholic princes and people to extirpate heretics, to search into their number and quality, and to transmit a faithful account thereof to Rome. Hence they were called *inquisitors*; and this gave birth to the formidable tribunal of the inquisition, which was received in all Italy, and the dominions of Spain, except the kingdom of Naples and the Low Countries.

This diabolical tribunal takes cognizance of heresy, Judaism, Mahometanism, Sodomy, and polygamy; and the people stand in so much fear of it, that parents deliver up their children, husbands their wives, and masters their servants, to its officers, without daring in the least to murmur. The prisoners are kept for a long time, till they themselves turn their own accusers, and declare the cause of their imprisonment; for they are neither told their crime, nor confronted with witnesses. As soon as they are imprisoned, their friends go into mourning, and speak of them as dead, not daring to solicit their pardon, lest they should be brought in as accomplices. When there is no shadow of proof against the pretended criminal, he is discharged, after suffering the most cruel tortures, a tedious and dreadful imprisonment, and the loss of the greatest part of his effects. The sentence against the prisoners is pronounced publicly, and with extraordinary solemnity. In Portugal, they erect a theatre capable of holding 3000 persons; in which they place a rich altar, and raise seats on each side in the form of an amphitheatre. There the prisoners are placed; and over-against them is a high chair, whither they are called, one by one, to hear their doom, from one of the inquisitors.

These unhappy people know what they are to suffer, by the cloaths they wear that day. Those who appear in their own cloaths, are discharged upon payment of a fine: those who have a *santo benito*, or strait yellow coat without sleeves, charged with St Andrew's crosses, have their lives, but forfeit all their effects: those who have the resemblance of flames, made of red serge, sewed upon their *santo benito*, without any crosses, are pardoned, but threatened to be burnt if ever they relapse: but those who, besides these flames, have on their *santo benito* their own picture, surrounded with figures of devils, are condemned to expire in the flames. The inquisitors, who are ecclesiastics, do not pronounce the sentence of death; but form and read an act, in which they say, that

the criminal being convicted of such a crime, by his own confession, is with much reluctance delivered to the secular power to be punished according to his demerits: and this writing they give to the seven judges who attend at the right side of the altar, who immediately pass sentence. For the conclusion of this horrid scene, see *ACT of Faith*.

INSCRIBED, in geometry. A figure is said to be inscribed in another, when all its angles touch the side or planes of the other figure.

INSCRIPTION, a title or writing carved, engraved, or affixed to any thing, to give a more distinct knowledge of it, or to transmit some important truth to posterity.

The inscriptions mentioned by Herodotus and Diodorus Siculus, sufficiently shew that this was the first method of conveying instruction to mankind, and transmitting the knowledge of history and sciences to posterity: thus the ancients engraved upon pillars both the principles of sciences, and the history of the world. Pisistratus carved precepts of husbandry on pillars of stone; and the treaties of confederacy between the Romans and Jews, were engraved on plates of brass. Hence, antiquarians have been very curious in examining the inscriptions on ancient ruins, coins, medals, &c.

Academy of INSCRIPTIONS. See **ACADEMY**.

INSECTS, **INSECTA**, in natural history, a smaller sort of animals, commonly supposed to be exanguinous; and distinguished by certain incisions, cuttings, or indentings in their bodies. The word is originally Latin, formed of *in*, and *seco*, "I cut;" the reason of which is, that in some of this tribe, as ants, the body seems to be cut or divided into two; or because the bodies of many, as worms, caterpillars, &c. are composed of divers circles, or rings, which are a sort of incisure.

By some natural historians, this class of animals is considered as the most imperfect of any, while others prefer them to the larger animals. One mark of their imperfection is said to be, that many of them can live a long time, though deprived of those organs which are necessary to life in the higher ranks of nature. Many of them are furnished with lungs and an heart, like the nobler animals; yet the caterpillar continues to live, though its heart and lungs, which is often the case, are entirely eaten away.—It is not, however, from their conformation alone that insects are inferior to other animals, but from their instincts also. It is true, that the ant and the bee present us with striking instances of assiduity; yet even these are inferior to the marks of sagacity displayed by the larger animals. A bee taken from the swarm is totally helpless and inactive, incapable of giving the smallest variation to its instincts. It has but one single method of operating; and if put from that, it can turn to no other. In the pursuits of the honey, there is something like choice; but in the labours of the bee, the whole appears like necessity and compulsion.—All other animals are capable of some degree of education; their instincts may be suppressed or altered; the dog may be taught to fetch and carry, the bird to whistle a tune, and the serpent to dance: but the insect has only one invariable method of operating; no arts can turn it from its instincts; and indeed its

Inferbed
Insects.

life

Insects.

life is too short for instruction, as a single season often terminates its existence.—Their amazing number is also an imperfection. It is a rule that obtains through all nature, that the nobler animals are slowly produced, and that nature acts with a kind of dignified economy; but the meaner births are lavished in profusion, and thousands are brought forth merely to supply the necessities of the more favourite part of the creation. Of all productions in nature, insects are by far the most numerous. The vegetables which cover the surface of the earth bear no proportion to the multitudes of insects; and though, at first sight, herbs of the field seem to be the parts of organized nature produced in the greatest abundance, yet, upon more minute inspection, we find every plant supporting a mixture of scarce perceptible creatures, that fill up the compass of youth, vigour, and age, in the space of a few days existence.—In Lapland, and some parts of America, the insects are so numerous, that if a candle is lighted they swarm about it in such multitudes, that it is instantly extinguished by them; and in these parts of the world, the miserable inhabitants are forced to smear their bodies and faces with tar, or some other unctuous composition, to protect them from the stings of their minute enemies.

On the other hand, Swammerdam argues for the perfection of insects in the following manner. “After an attentive examination (says he) of the nature and anatomy of the smallest as well as the largest animals, I cannot help allowing the least an equal, or perhaps a superior, degree of dignity. If, while we dissect with care the larger animals, we are filled with wonder at the elegant disposition of their parts, to what an height is our astonishment raised, when we discover all these parts arranged, in the least, in the same regular manner! Notwithstanding the smallness of ants, nothing hinders our preferring them to the largest animals, if we consider either their unwearied diligence, their wonderful strength, or their inimitable propensity to labour. Their amazing love to their young is still more unparalleled among the larger classes. They not only daily carry them to such places as may afford them food; but if by accident they are killed, and even cut into pieces, they will with the utmost tenderness carry them away piecemeal in their arms. Who can shew such an example among the larger animals which are dignified with the title of *perfect*? Who can find an instance in any other creature that can come in competition with this?”

On this dispute it is only necessary to observe, that the wisdom of the Creator is so conspicuous in all his works, and such surprising art is discovered in the mechanism of the body of every creature, that it is very difficult, if not impossible, to say where it is most, and where it is least, to be observed.—The nature and properties of insects are certainly very wonderful. Many particulars relating to them may be found under different articles of this work; but those who desire to see this subject treated in a full and ample manner, must have recourse to the works of Reaumur and Swammerdam.

Of the Kinds of INSECTS, and where the Collector for the Cabinet may find them. Insects in general are known to most people, the systematic distinctions but too few; nor have we any English names for the greatest

part of them. The general denominations of beetles, butterflies, moths, flies, bees, wasps, and a few other common names, are all that our language supplies. It would, therefore, be in vain to enumerate the immense variety of genera and species to any person unskilled in the science of entomology: we may, however, give directions under general names where to find each kind.

The class of insects is divided by Linnæus into seven orders. See ZOOLOGY.

I. The COLEOPTERA, (from *κορυνη*, a sheath, and *πτερον*, a wing,) are such insects as have crustaceous elytra or shells, which shut together, and form a longitudinal suture down the back of the insect; as the beetle, (*buprestis ignita*), fig. 11. Many of them (as the scarabæus or chafer, dermestes or leather-eater, hisper or mimic-beetle, staphylinus or rove-beetle, &c.) are found in and under the dung of animals, especially of cows, horses, and sheep. Some (as *lucanus* or stag-beetle, *cerambyx* or capricorn beetle, *dermestes*, &c.) are found in rotten and half-decayed wood, and under the decayed bark of trees. Others (as *hispæa*, *silpha* or carrion-beetle, *staphylinus*, &c.) on the carcases of animals that have been dead four or five days; on moist bones that have been gnawed by dogs or other animals; on flowers having a fetid smell; and on several kinds of fungous substances, particularly the rotten and most stinking. Others (as *byrrhus*, *curculio* or weevil, *bruchus* or feed-beetle, &c.) may be found in a morning about the bottoms of perpendicular rocks and sand-banks, and also upon the flowers of trees and herbaceous plants. Many kinds (as *gyrinus* or whirl-beetle, *dytiscus* or water-beetle, &c.) may be caught in rivers, lakes, and standing pools, by means of a thread-net, with small meshes, on a round wire-hoop, fixed at the end of a long pole. In the middle of the day, when the sun shines hot, some (as the *coccinella* or lady-fly, *buprestis* or burn-cow, *chrysomela* or golden honey-beetle, *cantharis* or soft-winged beetle, *elater* or spring-beetle, *negydalis* or clipt-winged beetle, &c.) are to be seen on plants and flowers, blighted trees and shrubs. Others (as *lampyris* or glow-worm, &c.) frequent moist meadows, and are best discovered at night, by the shining light which they emit. A great variety fit close on the leaves of plants, particularly of the burdock, elecampane, coltsfoot, dock, thistle, and the like, (as the *castrida* or tortoise-beetle, &c.); or feed on different kinds of tender herbs (as the *meloe* or blister-beetle.) Numbers (as the *tenebrio* or stinking-beetle,) may be found in houses, dark cellars, damp pits, caves, and subterraneous passages; or on umbelliferous flowers, (as the *cerambyx*, *pinus*, &c.); or on the trunks as well as on the leaves of trees, in timber-yards, and in the holes of decayed wood. Some (as the *leptura* or wood-beetle, *cicindela* or glossy-beetle, &c.) inhabit wild commons, the margins of pools, marshes, and rivulets; and are likewise seen creeping on flags, reeds, and all kinds of water-plants. Multitudes (as the *carabus* or ground-beetle) live under stones, moss, rubbish, and wrecks near the shores of lakes and rivers. These are found also in bogs, marshes, moist places, pits, holes of the earth, and on stems of trees; and in an evening they crawl plentifully along path-ways after a shower of rain. Some (as the *forficula* or earwig) may be discovered

Insects.

Plate
CLIV.Lettisome's
Naturalist's
Companion,
p. 2, &c.

in the hollow stems of decayed umbelliferous plants, and on many forts of flowers and fruits.

II. HEMIPTERA, (from *hemis*, half, and *pteron*, a wing,) have their upper wings usually half crustaceous and half membranaceous, not divided by a longitudinal suture, but incumbent on each other; as the *cimex*, fig. 12. Some of these (as the *blatta* or cockroach) are found about bake-houses, &c.; others (as the *mantis* or camel-cricket, *gyllis* or locust, *fulgora*, *cadada*, or flea-locust, *cimex* or bug, &c.) on grafs, and all kinds of wild-herbage. Some (as *notonecta* or boat-fly, *nepa* or water-scorpion, &c.) frequent rivers, lakes, and standing pools.

III. LEPIDOPTERA, (from *lepis*, a scale, and *pteron*, a wing,) are insects having four wings, covered with fine scales in the form of powder or meal; as in the butterfly, (*papilio antiopa*), fig. 13. In the day, when the sun is warm, butterflies are seen on many sorts of trees, shrubs, plants, and flowers. Moths may be seen in the day-time, sitting on pales, walls, trunks of trees, in shades, out-houses, dry holes, and crevices; on fine evenings, they fly about the places they inhabit in the day-time: some (as the *sphinx* or hawk-moth,) are seen flying in the day-time over the flowers of honey-suckles and other plants with tubular flowers. Insects of this species seldom sit to feed, but continue vibrating on the wing, while they thrust the tongue or proboscis into the flowers.

IV. NEUROPTERA, (from *neuron*, a nerve, and *pteron*, a wing,) have four membranous transparent naked wings, generally like network; as in the *panorpa coa*, fig. 14. Of these, some (as the *myrmelion*, *temerobius* or pearl-fly, *raphidia* or camel-fly, &c.) are found in woods, hedges, meadows, sand-banks, walls, pales, fruits, and umbelliferous flowers. Others (as *libellula* or dragon-fly, *ephemera* or may-fly, *phryganea* or spring-fly, &c.) fly about lakes and rivers in the day.

V. HYMENOPTERA, (from *hymen*, a membrane, and *pteron*, a wing,) are insects with four membranous wings, tail furnished with a sting; as in the *tenthredo*, fig. 15. These, including wasps, bees, &c. frequent hedges, shrubs, flowers, and fruits.

VI. DIPTERA, (from *diu*, two, and *pteron*, a wing,) are such as have only two wings, and poisers; as in the fly, fig. 16. Flies of various kinds constitute this class; of which some (as *asflar* or gad-fly, *musca* or fly, *tubanus* or whame,) fly about the tops of trees, little hills, horses, cows, sheep, ditches, dunghills, and every offensive object. Others (as *tipula*, *conops*, *asilus* or wasp-fly, &c.) are found on all sorts of flowers, particularly those of a fetid smell.

VII. APTEA (from *a*, without, and *pteron*, a wing, insects having no wings. This last division contains scorpions, spiders, crabs, lobsters, &c.

Of Catching and Preserving Insects for Collections. In the following directions, we shall relate the methods of killing them the most readily, and with the least pain, as the pursuit of this part of natural history hath been often branded with cruelty; and however reasonably the naturalist may exculpate himself by pleading the propriety of submitting to an evil which leads to useful discoveries, yet for wanton cruelty there never can be a just pretext:

—The poor beetle that we tread upon,

In corp'ral sufferance feels a pang as great
As when a giant dies.

1. The first class, consisting of beetles (*coleoptera*), are hard-winged. Many kinds fly about in the day, others in the evening, some at night only. They may be caught with a gauze-net, or a pair of forceps covered with gauze. When they are taken, stick a pin thro' the middle of one of the hard wings, and pass it thro' the body. They may be killed instantly, by immersion in hot water, as well as in spirit of wine; then stick them on a piece of cork, and afterwards carefully place their legs in a creeping position, and let them continue exposed to the air until all the moisture is evaporated from their bodies. Beetles may also be preserved in spirit of wine, brandy, or rum, closely corked up.

2. Insects of the second class (*hemiptera*) may be killed in the same manner as beetles, and likewise by means of a drop of the ethereal oil of turpentine applied to the head; or in the manner to be described under the next class for killing moths.

3. The division of butterflies and moths, (*lepidoptera*), as well as all flies within membranaceous wings, should be caught with a gauze net, or a pair of gauze forceps; when taken in the forceps, run a pin through the thorax or shoulders, between the forewings. After this is done, take the pin by the head, and remove the forceps, and with the other hand pinch the breast of the insect, and it will immediately die: the wings of butterflies should be expanded, and kept so by the pressure of small slips of paper for a day or two. Moths expand their wings when at rest, and they will naturally take that position.

The larger kinds of these insects will not so readily expire by this method, as by sticking them upon the bottom of a cork exactly fitted to the mouth of a bottle, into which a little sulphur had been put, and by gradually heating the bottle, till an exhalation of the sulphur take place, when the insect instantly dies, without injuring its colours or plumage.

The best method of having the most perfect butterflies, is to find out, if possible, the larva or caterpillar of each, by examining the plants, shrubs, or trees, they usually feed upon, or by beating the shrubs and trees with long poles, and thereby shaking the caterpillars into a sheet spread underneath to receive them; to put them into boxes covered with thin canvas, gauze, or cat-gut, and to feed them with the fresh leaves of the tree or herb on which they are found; when they are full grown, they will go into the pupa or chrysalis state, and require then no other care till they come out perfect butterflies, at which time they may be killed, as before directed. Sometimes these insects may be found hanging to walls, pales, and branches of trees, in the chrysalis state.

Moths might likewise be procured more perfect, by collecting the caterpillars, and breeding them in the same manner as butterflies. As the larvae or caterpillars cannot be preserved dry, nor very well kept in spirit, it would be satisfactory if exact drawings could be made of them while they are alive and perfect. It may be necessary to observe, that in breeding these kinds of insects, some earth should be put into the boxes, as likewise some rotten wood in the corners; because, when the caterpillars change into the pupa-

Insects.

or chrysalis state, some go into the earth, and continue under ground for many months before they come out into the moth state; and some cover themselves with a hard shell, made up of small pieces of rotten wood.

4. The fourth class of insects (*neuroptera*) may be killed with spirit of wine, oil of turpentine, or by the fumes of sulphur.

5. Those of the next class (*hymenoptera*) may be killed in the same manner. A pin may be run thro' one of their wing-shells and body.

6. Insects of the sixth class (*diptera*) may likewise be killed by spirit, or by fumes of sulphur.

7. Those of the last division (*aptera*) are in general subjects which should be kept in spirit.

When in search of insects, we should have a box suitable to carry in the pocket, lined with cork at the bottom and top to stick them upon, until they are brought home. If this box be strongly impregnated with camphor, the insects soon become stupified, and are thereby prevented from fluttering and injuring their plumage. Besides a gauze forceps, the collector should have a large musquito gauze-net, and also a pin-cushion with three or four different sizes of pins, to suit the different sizes of insects.

In hot climates, insects of every kind, but particularly the larger, are liable to be eaten by ants and other small insects; especially before they are perfectly dry: to avoid this, the piece of cork on which our insects are stuck in order to be dried, should be suspended from the ceiling of a room, by means of a slender string or thread; besmear this thread with bird-lime, or some adhesive substance, to intercept the rapacious vermin of these climes in their passage along the thread.

After our insects are properly dried, they may be placed in the cabinet or boxes where they are to remain: these boxes should be kept dry; and also made to shut very close, to prevent small insects from destroying them; the bottoms of the boxes should be covered with pitch, or green wax, over which paper may be laid; or, which is better, lined with cork, well impregnated with a solution of corrosive sublimate mercury in a saturated solution of crude sal-ammoniac in water, an ounce of which will dissolve 20 scruples of the sublimate.

The finest collections have been ruined by small insects, and it is impossible to have our cabinets too secure. Such insects as are thus attacked may be fumigated with sulphur, in the manner described for killing moths; if this prove ineffectual, they may be immersed in spirit of wine, without much injuring their fine plumage or colours, and afterwards let them be sprinkled about their bodies and insertions of the wings with the solution above-mentioned. But baking the insects in an oven, in the manner described for BIRDS (under that article), is the most effectual method of extirpating these enemies; however, the utmost caution is requisite in this process, in regulating the heat of the oven.

N. B. All kinds of insects having no wings, may be preserved in spirits, brandy, or rum; except crabs, lobsters, and the like, which may conveniently be preserved dry.

INSECTS giving root to Plants. Of this we have an account, by Mr Fourgeroux, in the Memoirs of the A-

Insects.

cademy of Sciences for 1769. The plants, of which Mr Fourgeroux gives an account, are perfectly the reverse of the worm-plant of China, described by Mr Reaumur in the year 1726. For, in that case, a worm fixes its snout into the extremity of the plant, and derives nourishment from it. But the plants, of which an account is here given, derive their nourishment from the animals.

The greatest part of the animal-plants which he has seen, grow, he tells us, on the chrysalis of a species of cicada. The plant growing on these insects has got the generic name of *clavaria*, because its stalks and branches, when it has any, are terminated by tubercles, which give the appearance of little clubs. The root of this plant, in general, covers the body of the insect, and sometimes is even extended over its head. When these productions have for some time been preserved in spirits, the plant and animal may be separated from each other without hurting either. Small grooves, formed by the rings of the animal, may be observed running cross the roots of the plant: but no vestige can be found of the root's having any where penetrated the body of the insect. These plants produce fibres differing in length and number. The fibres are terminated by tubercles, which, before the plant arrives at maturity, are solid; but, after that period, they are found punctured, probably by worms which have suffered a metamorphosis upon escaping from them.

According to Mr Fourgeroux, plants grow, not only on the chrysalis of the cicada, but upon the cicada itself. He saw one of this kind upon a cicada brought from Cayenne. The plant, in this case, differed from the *clavaria* already mentioned. It was a species of fungus, composed of long, white, silky fibres, covering the body of the insect, and extending from seven to eight lines above and below its belly.

The author has found the *clavaria* growing upon worms. He has found it chiefly upon worms, which suffering a metamorphosis, become afterwards a small species of May-bug. This chrysalis, he observes, is very different from that of the cicada; and, even in its worm-state, may easily be distinguished from it.

After describing these different species of animal-plants, the author next proceeds to offer his opinion upon this subject. He first considers what had been said by Dr Watson, in the Philosophical Transactions, concerning the vegetating-fly of the Caribbee islands *. Dr Watson's account of these flies is, that they bury themselves about the month of May, and begin to be metamorphosed in June; and that the little plant which grows upon them resembles a branch of coral, is about three inches in height, and carries small protuberances, where worms are generated, which are again converted into flies. The author imagines, that, in this account, Dr Watson has been deceived by the worms, which he has already observed will eat into the *clavaria*, and undergo a change in the holes which they have there made. Mr Fourgeroux is rather inclined to adopt the opinion of Dr Hill, founded upon observations made at Martinico. There the cicade are very frequent; and, during their chrysalis state, bury themselves among dead leaves, to wait their metamorphosis. Dr Hill imagines, that the seeds of the *clavaria* are then attached to them, and are afterwards developed, much in the same manner as the fungus ex pede equino

* See
Vegetabil
FLY.

Insects
||
Inspiration.

equino grows upon the hoofs of dead horses.

It may appear astonishing, that the clavaria should attach itself so constantly to the nymphæ of the cicadæ in America, as it is not observed to do so in other countries. For this Mr Fourgeroux attempts to account, from viewing the clavaria as a parasite peculiar to this species of insect; from the great number of the nymphæ of cicadæ which abound in America; and from the circumstances of the climate and soil, which may render this phenomenon very common there, although it be not observed in Europe.

A. Med.
m. ii. 371.

INSECTS blown from the *Nefe*. Of this we are furnished with many accounts in the works of medical authors. The fact is confirmed by Dr Monro *, who has received at different times some of these insects from different persons. They were all of the scolopendra kind, though not exactly answering to any description of Linnaeus. One of these he received from Mr Hill furgeon in Dumfries. It was an inch and a half long; and lived some hours after it was discharged, creeping about slowly on a table. It was then put into ardent spirits, soon after which it died.

INSERTION, in anatomy, the close conjunction of the vessels, tendons, fibres, and membranes of the body with some other parts.

INSIPID, an appellation given to things without taste.

INSOLATION, in chemistry, the suffering matters to stand and digest in the heat of the sun, instead of that of a furnace.

INSOLVENT, a term applied to persons unable to pay their debts.

Trial by INSPECTION, or *EXAMINATION*, is when, for the greater expedition of a cause, in some point or issue, being either the principal question, or arising collaterally out of it, but being evidently the object of sense, the judges of the court, upon the testimony of their own senses, shall decide the point in dispute. For, where the affirmative or negative of a question is matter of such obvious determination, it is not thought necessary to summon a jury to decide it; who are properly called in to inform the conscience of the court of dubious facts: and therefore, when the fact, from its nature, must be evident to the court either from ocular demonstration or other irrefragable proof, there the law departs from its usual resort, the verdict of 12 men, and relies on the judgment of the court alone. As in case of a suit to reverse a fine for non-age of the cognizor, or to set aside a statute or recognizance entered into by an infant; here, and in other cases of the like sort, a writ shall issue to the sheriff, commanding him that he constrain the said party to appear, that it may be ascertained by the view of his body by the king's justices, whether he be of full age or not: *Ut per aspectum corporis sui constare poterit iussurarii nostris, si prædictus an sit plene ætatis necne*. If, however, the court has, upon inspection, any doubt of the age of the party, (as may frequently be the case), it may proceed to take proofs of the fact; and particularly may examine the infant himself upon an oath of *voir dire, veritatem dicere*; that is, to make true answers to such questions as the court shall demand of him: or the court may examine his mother, his godfather, or the like.

INSPIRATION, among divines, implies the con-

Vol. V.

veying of certain extraordinary and supernatural notions or motions into the soul.

Inspiration
||
Instauration.

Some authors reduce the inspiration of the sacred writers to a particular care of providence, which prevented any thing they had said from failing or coming to nought; maintaining, that they never were really inspired, either with knowledge or expression.

According to M. Simon, inspiration is no more than a direction of the Holy Spirit, which never permitted the sacred writers to be mistaken.

It is a common opinion, that the inspiration of the Holy Spirit regards only the matter, not the style or words; which seems to fall in with M. Simon's doctrine of direction.

Among the heathens, the priests and priestesses were said to be divinely inspired when they gave oracles.

The poets, too, laid claim to it; and to this end always invoked Apollo and the muses at the beginning of any great work.

INSPIRATION, in physic, is understood of that action of the breast, by which the air is admitted within the lungs; in which sense, inspiration is a branch of respiration, and stands opposed to **EXPIRATION**.

This admission of the air depends immediately on its spring or elasticity, at the time when the cavity of the breast is enlarged by the elevation of the thorax and abdomen, and particularly by the motion of the diaphragm downwards: so that the air does not enter the lungs, because they are dilated; but those dilate, because the air enters within them. Nor is it the dilatation of the breast which draws in the air, as is commonly thought, tho' this is a condition absolutely necessary to inspiration; but an actual intrusion of the air into the lungs. See **RESPIRATION**.

INSPISSATING, in pharmacy, an operation whereby a liquor is brought to a thicker consistence, by evaporating the thicker parts.

INSBRUCK, a city of Germany, in the circle of Austria, and capital of the county of Tyrol, and formerly the residence of the archdukes of Austria. It is seated in a pleasant valley, in E. long. 11. 27. N. Lat. 47. 3.

INSTALLATION, the act of giving visible possession of an order, rank, or office, by placing in the proper seat. See **INSTALLMENT**.

INSTALLMENT, a settling or installing any person in a dignity. The word is derived from the Latin *in*, and *stallum*, a term used for a seat in church, in the choir, or a seat or bench in a court of justice, &c. Though Vossius is of opinion the word is of German origin.

INSTALLMENT is chiefly used for the induction of a dean, prebendary, or other ecclesiastical dignitary, into the possession of his stall, or proper seat, in the cathedral church to which he belongs. This is sometimes also called *installation*.

INSTALLMENT is likewise used for the ceremony, whereby the knights of the garter are placed in their rank, in the chapel of St George at Windsor.

INSTANT, a part of duration in which we perceive no succession; or it is that which takes up the time only of one idea in our minds.

INSTAURATION, the re-establishment or re-auration of a religion, a church, or the like, to its

Instep
Insurance.

former state. The word is by some derived from the old Latin *insaurum*, which signified the "stock" of things necessary for the tilling and managing of grounds; as cattle, tools, harness, &c. But the word *insaurum* is only of the middle age: *insauratio* is of much greater antiquity, and by some derived from *insar*, "like;" as importing a thing's being brought to its former likeness or appearance. See RESTAURATION.

INSTEP, in the manege, is that part of a horse's hind leg which reaches from the ham to the pastern-joint.

INSTINCT, a natural disposition or sagacity whereby animals are endued; by virtue whereof they are enabled to provide for themselves, know what is good for them, and determined to preserve and propagate their species.

INSTINCT bears some analogy to reason, and supplies the defect of it in brutes. See BRUTE.

INSTITUTES, in literary history, a book containing the elements of the Roman law.

The institutes are divided into four books; and contain an abridgement of the whole body of the civil law, being designed for the use of students. See Law, n° 6,—11. and 43, 44.

INSTITUTE, in Scots law. When by disposition or deed of entail a number of persons are called to the succession of an estate one after another, the person first named is called the *institute*, the others *substitutes*.

INSTITUTION, in general, signifies the establishing or founding something.—In the canon and common law, it signifies the investing a clerk with the spiritualities of a rectory, &c. which is done by the bishop, who uses the following formula: "I institute you rector of such a church with the cure of souls, and receive your care and mine."

INSTITUTIONS, in literary matters, denote a system of the elements or rules of any art or science.

Thus physical, or medicinal institutions, are such as teach the necessary præcognita to the practice of medicine, or the cure of diseases.

INSTRUMENT, in general, whatever is subservient to a cause in producing any effect.

Natural INSTRUMENT, in Scots law, any fact certified in writing, under the hand of a notary-public.

INSULAR, any thing belonging to an island.—Insular situations are productive of many happy consequences to the inhabitants, both with respect to the climate, security, and convenience for commerce; for a particular account of which, see ISLAND and COAST.

INSULATED, in architecture, an appellation given to such columns as stand alone, or free from any contiguous wall, like an island in the sea; whence the name.

INSULATED, in electrical experiments. When any body is prevented from communicating with the earth by the interposition of an electric body, it is said to be *insulated*. See ELECTRICITY, n° 20.

INSURANCE, in law and commerce, a contract, whereby one party engages to pay the losses which the other may sustain, for a stipulated premium or consideration. The most common sorts are, Insurance against the dangers of the seas, insurance against fire, insurance of debts, and insurance of lives.

Insurance.

I. *INSURANCE against Loss at Sea*, is a most beneficial institution, for promoting the security of trade, and preventing the ruin of individuals; and is now conducted by a regular system of rules, established by the interposition of the legislature, the decision of the courts of justice, and the practice of merchants.

It is carried on to the best advantage by public companies, or by a considerable number of private persons, each of whom only engages for a small sum, on the same vessel. There are two public companies established by authority of parliament, viz. the London and Royal Exchange Insurance-Companies. For procuring subscription by private persons, brokers are generally employed, who extend the policy or contract of insurance, procure subscriptions, and assist at settling losses. They are entitled to an allowance for their trouble, generally 5 per cent. on premiums, and 2 per cent. on losses.

The parties who engage to pay the damage are called the *insurers* or *under-writers*; the parties for whose security they engage are called the *insured*. The premium is understood to be paid when the insurance is made; but, if it be not paid, the insurers have a preferable right on the subject insured.

On this subject, we shall consider, What is necessary to render an insurance valid:—When the risk commences, and when it terminates:—What constitutes a total or a partial loss:—What proof of loss is necessary:—and, How the loss is adjusted.

First, In order to render an insurance valid, the insured must have property really at stake; the voyage must take place under the circumstances agreed on; the dangers insured against must not be contrary to law; and a candid account must be given of circumstances which enhance the danger.

1. The condition of possessing property was required by 19 Geo. II. c. 37. to prevent ships from being fraudulently destroyed when insured above their value; and to discourage a practice which had become common, of converting policies to the purpose of mere wagers. In transactions of this kind, as the insured had no property, and could claim no indemnification for partial damage; so the insurers, having lost their wager by the ship's being lost, could claim no abatement, though part was saved: accordingly, the policies contained clauses of interest or no interest, free from average, and without benefit of salvage. All such policies are declared invalid.

This restriction does not extend to privateers, nor to ships trading to the Spanish or Portuguese plantations.

Insurances are commonly made as interest shall appear; and it is incumbent on the insured to prove the value of his property. The value of the goods may be proved by the invoices; and the coquet must be produced, if required, to instruct that the goods were actually shipped. It is admitted to value the ship at prime cost and charges, deducting the freights that have been drawn since purchased, if the proprietors choose to stand to that rule; but they are not restricted to it. Sometimes the value of the ship or goods is expressed in the policy; and this value must be admitted, although it be higher than the true one: but it is incumbent on the insured to prove that he had property

property at stake; and, if the property be trifling in comparison of the sum insured, the insurance will be set aside, as an evasion of the statute.

Expected profits, and bounty on the whale-fishery, if specified in the policy, may be insured.

When the value is less than the sum insured, the owners may claim a return of premium for the excess.

If there be several policies on the same subject, of different dates, the earlier one is valid, and the others must be vacated. If they be of the same date, they must be vacated in equal proportions.

When a policy is vacated, in whole, or in part, the under-writers have a right to retain $\frac{1}{2}$ per cent. for their trouble.

In the case of a cargo intended for A, but afterwards sent to B, both expected it, and insured, and B claimed for the value on its being lost. The under-writers answered, that it was a double insurance, and they ought only to pay their proportion. Judgment was given, finding them liable for the whole, and reserving to them any demand competent against the underwriters who insured for A.

Fraudulently to cast away or destroy a ship insured above its value, is felony.

2. If the ship does not proceed on the voyage, or if, being warranted to depart with convoy, it departs without convoy, the insurance must be vacated.

If the extent of a trading voyage be uncertain, the longest one in contemplation is described in the policy, and it is agreed that part of the premium shall be returned if the voyage be shortened. In like manner, in time of war, when insurance is made without condition of convoy, it is agreed that part of the premium be returned in case it fail with convoy.

When a ship is warranted to depart with convoy, it is understood from the usual place of convoy, (*e. g.* the Downs,) and it is insured till it arrive there.

The common proof of failing with convoy is the production of failing orders; but, if a ship be prevented by the weather from receiving the failing orders, other proof may be admitted.

A ship was insured from the Thames to Halifax, warranted to sail from Portsmouth with convoy. The convoy had failed before the ship arrived there, and the underwriters declined to insure it, without convoy, for the rest of the voyage. They were found liable to return part of the premium, retaining only in proportion to the accustomed rate from London to Portsmouth. This decision seems to establish the following principle, that, when the voyage performed is only part of that described in the policy, and when the risk can be proportioned, the underwriters are bound to return part of the premium, though there be no agreement for that purpose.

But, if a ship, insured only against the hazards of the sea, be taken by the enemy, the insured have no right to claim a return of premium, though the capture happen soon, under pretence that little sea-hazard was incurred.

If a ship deviates from the voyage described in the policy without necessity, it sets aside the insurance. An intention to deviate is not sufficient to set it aside; there must be an actual deviation; and, even in that case, the insurers are liable for damages sustained be-

fore deviation.

It is no deviation to go out of the way to the accustomed place of convoy, nor to the nearest place where necessary repairs may be had. Deviation, for the purpose of smuggling, if without the knowledge of the owners, does not set aside the insurance, nor when the master is forced by the crew to return.

In insurances to the East-Indies, and home, the insurers are understood to take the risk of detention in the country, and of country voyages.

3. Insurance of prohibited goods, against the risk of seizure by the government, is unlawful, and invalid. The insurers, insured, brokers, and all accessories, are liable to the fine of 500*l*.

4. If the insured have any information of more than common danger, they must reveal every such circumstance to the insurers, otherwise the policy is set aside.

This rule is established for the preservation of good faith; and there are several strong decisions in support of it. If a ship be spoke to leaky at sea, or if there be a report of its being lost, these circumstances must be communicated to the insurers. Even the concealment of a false report of loss vitiates the insurance; and, if the ship be afterwards lost, though in a different manner, the insured will recover nothing. In a voyage from Carolina to London, another ship had failed to days after that which was insured, and arrived seven days before the insurance was made; and the concealment of this circumstance, though the fact was not proved to the satisfaction of the jury, was considered as sufficient to set it aside. Also, since the commencement of the American war, a ship being insured from Portugal, by the month, without condescending on the voyage, sailed for North-America, and was taken by a provincial privateer. The insurers refused to pay, because the hazardous destination was concealed; and it was only upon proof of the insured being equally ignorant of it, that they were found liable.

But the insured are not obliged to take notice of general perils, which the insurers are understood to have in contemplation; dangerous navigation, West-Indian hurricanes, enterprizes of the enemy, and the like.

Insurance is not set aside by a mistake in the name of the ship or master, or the like.

Insurance may be made on an uncertain ship; on any ship that the goods may be loaded on; on any ship that A shall sail in from Virginia. In this last case, the policy is not transferred to a ship which A goes on board during the voyage.

Secondly, If a ship be insured at and from a port, the insurance commences immediately if the ship be there, or at its arrival there. If it be damaged when preparing for a voyage, the insurers are liable; but not if the voyage be laid aside for several years, with consent of the owners. Insurance from a port commences when the ship breaks ground; and, if it set sail, and be driven back and lost in the port, the insurers are liable.

Insurance on goods generally continues till they be landed; but, if they be sold after the ship's arrival, and freight contracted to another port, the insurance is concluded. Goods sent on board another ship or

lighter are not at the risk of the insurer; but goods sent ashore in the long-boat are.

Insurance on freight commences when the goods are put on board.

Goods from the East-Indies, insured to Gibraltar, and to be re-shipped from thence to Britain, were put on board a store-ship at Gibraltar, to wait an opportunity of re-shipping, and were lost: The custom of putting goods aboard a store-ship being proved, the insurers were found liable.

Loss of sails ashore, when the ship is repairing, is comprehended within the insurance. What is necessarily understood, is insured, as well as what is expressed; the essential means, and intermediate steps, as well as the end. Ships performing quarantine are at the risk of the insurer.

Thirdly, The insurers are liable for a total loss when the subject perishes through any of the perils insured against. Baratry, though it properly signifies running away with the ship, extends to any kind of fraud in the master or mariners. Insurance against detention of princes does not extend to ships that are seized for transgressing the laws of foreign countries.

The insurers are also liable for a total loss, when damage is sustained, and the remaining property abandoned or vested in the insurers.

If a ship be stranded, or taken, and kept by the enemy, or detained by any foreign power, or seized for the service of the government, the proprietors have a right to abandon.

But, if a ship be taken by the enemy, and be retaken, or makes its escape, before action against the insurers; have the insured a right to abandon, or must they only claim for the damages sustained as an average loss? There are opposite decisions, according as the circumstances of the case were strong. When the ship was long detained, the goods perishable, the voyage intirely lost, or so disturbed, that the pursuit of it was not worth the freight, or when the damage exceeds half the value of the thing, they have been found intitled to abandon; (Goss against Withers, 2 Burr., 683.). But, if the voyage be completed with little trouble or delay, they are not intitled; (Hamilton against Mendez, 2 Burr., 1198.).

The insured cannot claim, as for a total loss, on an offer to abandon, when the loss is, in its nature, only partial; for, if this were permitted, they might devolve the loss occasioned by bad markets on the insurers.

And, in all cases, the insured have their option to abandon, or not. They may retain their property if they please, and claim for an average loss; and they must make their option before they claim.

If the goods be so much damaged, that their value is less than the freight, the insurers are accountable as for a total loss.

The insurers are liable for general average, when the property is charged with contribution; and for particular average, when the property is damaged, or part of it destroyed.

If the damage be sustained through the fault of the ship, the owners of the goods may have recourse, either against the master or insurers; and, if the insurers be charged, they stand in the place of the owners, and have recourse against the master.

In order to prevent the insurers from being troubled with frivolous demands for average, it is generally stipulated, that none shall be charged under 5 per cent. or some other determined rate; and corn, flax, fruit, fish, and like perishable goods, are warranted free from average, unless general, or the ship be stranded.

In order to encourage every effort to save the ship, the insurers are liable for charges laid out with that design, although the subject perish. Thus, they may be charged with more than the sum insured.

In case of goods being damaged, the proportion of the sum insured, for which the underwriters are liable, is regulated by the proportion of the prices which the sound and damaged goods fetch at the port of destination. The prime cost of the goods is not considered, nor the necessity of immediate sale, in consequence of damage. Although the damaged goods sell above prime cost, the insurers are liable.

Fourthly, If a ship be lost, and the crew saved, the loss is proved by the evidence of the crew.

If damage be sustained, the extent is proved by an examination of the subject damaged, at the ship's arrival; and the cause by the evidence of the crew.

If the ship be stranded, evidence must be taken at the place where stranded.

Documents of loss must be laid before the underwriters, with all convenient speed; and, if these be sufficiently clear, the loss should be immediately settled. The underwriters generally grant their notes at a month or six weeks date for their proportions.

If a ship be not heard of for a certain time, it is presumed lost; and the underwriters are liable to pay the sums insured, the property being abandoned to them in the event of the ship's return. Six months are allowed for a voyage to any part of Europe, a year to America, and two years to the East Indies.

By the ordinance of Hamburg, if a ship be three months beyond the usual time of performing a voyage, the underwriters may be decreed to pay 92 per cent. on an abandon. If they decline it, they are allowed 14 months more, and then they must pay the full value.

A ship insured against the hazards of the sea, but not against the enemy, if never heard of, is presumed lost at sea.

Fifthly, In order that the manner of settling losses may be understood, we must explain what is meant by covering property. We mentioned already, that insurances for greater sums than the insured had really at stake, were contrary to law: but some latitude is allowed in that respect; for if the owner were to insure no more than the exact value of his property, he would lose the premium of insurance, and the abatement, if any was agreed on.

For example, if he has goods on board to the value of 100 l. and insures the same at 5 per cent. to abate 2 per cent. in case of loss; then, if a total loss happens, he recovers 98 l. from the insurers, of which 5 l. being applied to re-place the premium, the nett sum saved is only 93 l.: but, if the value on board be only 93 l. and the sum insured 100 l. he would be fully indemnified for the loss; and his property, in that case, is said to be covered.

To find how much should be insured to cover any sum, subtract the amount of the premium and abatement

Insurance. ment (if any), from 100*l.* As the remainder is to 100*l.* so is the value, to the sum which covers it.

Insurance
} Integral.

In case of a total loss, if the sum insured be not greater than that which covers the property, the insurers must pay it all. If greater, they pay what covers the property, and return the premium on the overplus.

Partial losses are regulated by this principle, that whereas the owner is not fully indemnified, in case of a total loss, unless he covers his property, therefore he should only be indemnified for a partial loss in the same proportion; and, if it be not fully insured, he is considered as insurer himself, for the part not covered, and must bear a suitable proportion of the loss. Therefore the value of the property is proved, and the sum required to cover it computed. If that sum be all insured, the underwriters pay the whole damage; if only part be insured, they pay their share, which is computed by the following rule: As the sum which covers the property is to the sum insured, so is the whole damage to the part for which the insurers are liable.—For example, if the value of the property be 360*l.* the sum insured 300*l.* the premium 8 *per cent.* and abatement 2 *per cent.*; then the sum which should be insured to cover the property is 400*l.*; and, if damage be sustained to the extent of 200*l.* the owners will recover 150*l.*

If a voyage is insured out and home, the premium outward must be considered as part of the value on the homeward property, and the sum necessary to cover it computed accordingly. For example, to insure 100*l.* out and home, at 5 *per cent.* each voyage, abatement 2 *per cent.* we compute thus:

93 : 100 :: L. 100 : L. 107 : 10 : 6, to be insured outward, premium on L. 107 : 10 : 6 onwards, at 5 *per cent.* L. 5 : 7 : 6; 93 : 100 :: L. 105 : 7 : 6 : L. 113 : 6*s.* to be insured home; the premium on which is L. 5 : 13 : 6; and, if the ship be lost on the homeward voyage,

From the sum insured home	L. 113	6	0
Subtract the discount, 2 per cent.	-	2	5 3
Sum for which the insurers are liable	L. 111	—	—
Insurance out	L. 5	7	6
Insurance home	-	5	13 3
		11	— 9

Covered property L. 100 — —
 II. *Insurance against Fire.* There are several offices in Britain for this purpose, of which the fire-office is the most considerable. Insurances are divided into common, hazardous, and doubly hazardous, according to the nature of the subject insured. When the sum insured is high, there is a higher premium *per cent.* demanded; and money, papers, jewels, pictures, and gun-powder, are not comprehended. If a subject be wrong described, in order that it may be insured at a lower premium, the policy is void. The benefit of a policy is transferred, by indorsement, to the representatives of the person in whose favour it was made; and it may be transferred to other houses when the insured changes his habitation. If insurance be made on the same subject in different offices, it must be specified, by indorsement, on the policy; and, in case of loss, the offices pay proportionally. The insurers

pay all expences in attempts to extinguish fire, or save goods, though not successful. If the value of a subject be insured in part, and damage be sustained, the insurers pay the whole, if it does not exceed the sum insured.

III. *Insurance of Debts.* See BOTTOMRY.

IV. In virtue of *INSURANCES for Lives*, when the person dies, a sum of money becomes payable to the person on whose behalf the policy of insurance was granted. The principal insurance office of this kind, is that of the amicable society for a perpetual assurance, kept in Serjeant's inn, Fleet-street, London.

In this office, after paying the charges of the policy, and 10*s.* entrance-money, each person pays 5*l.* *per annum*, by quarterly payments; and from these payments, the dividends, which usually amount 100*l.* and upwards, are to arise. All persons admitted are to be between the ages of 12 and 45, and in a good state of health. Any person is allowed to have two or three insurances or numbers on the same life, whereby such person will be intitled to a claim on each number so insured; and every claimant is empowered to put in a new life in the room of one deceased, within 12 kalendar months next after the end of the current year. By becoming members of this society, clergymen, physicians, lawyers, tradesmen, and all whose income ceases at the time of their death, may, in all probability, leave to their families a claim of not less than 100*l.* for every 5*l.* annually paid in.—The value of insurances upon lives, depends upon the probability of the continuance of any proposed life or lives, during any proposed term. Any questions of this kind may be determined from Dr Halley's table, and from the principles of the doctrine of chances. But, as far as we can learn of the practice on such occasions, the premiums paid to insurers are generally higher than any computation founded on observations concerning the probabilities of human life will warrant. Thus it is not unusual to make a person pay 5 *per cent.* for the insurance of his life for a twelve-month; that is, in case the person dies within the year, the insurer is to pay 100*l.* for every 5*l.* received. Now it appears from Dr Halley's table, which estimates the probability of life low enough, that 5 *per cent.* is an adequate value only for a life of an advanced age, such as 64.

Re-Insurance is a second contract, made by an insurer, to transfer the risk he has engaged for to another. It is in general forbidden by 19 Geo. II. c. 37. but is permitted to the representatives of an insurer, in case of his death, or to his assignees, in case of his bankruptcy; and it must be mentioned in the policy that it is a re-insurance.

INTAGLIOS, precious stones on which are engraved the heads of great men, inscriptions, and the like; such as we frequently see set in rings, seals, &c.

INTEGER, in arithmetic, a whole number, in contradistinction to a fraction.

INTEGRAL, or INTEGRANT, in philosophy, appellations given to parts of bodies which are of a similar nature with the whole: thus filings of iron have the same nature and properties as bars of iron.

Bodies may be reduced into their integrant parts by triture or grinding, limation or filing, solution, amalgamation, &c. See GRINDING, &c.

Integuments
||
Interdict.

INTEGUMENTS, in anatomy, denote the common coverings which invest the body ; as the cuticula, cutis, &c. See **ANATOMY**.

INTEGUMENT, is also extended to the particular membranes which invest certain parts of the body ; as the coats or tunics of the eye.

INTENDANT, one who has the conduct, inspection, and management of any thing. See **SUPER-INTENDANT**.

This is a title frequent among the French : they have *intendants of the marine*, who are officers in the sea-ports, whose business it is to take care the ordinances and regulations relating to sea-affairs be observed : *intendants of the finances*, who have the direction of the revenues : *intendants of provinces*, who are appointed by the king to take care of the administration of justice, policy, and finances in the provinces : also *intendants of buildings, of houses, &c.*

INTENDMENT, in law, is the intention, design, or true meaning, of a person or thing, which frequently supplies what is not fully expressed : but tho' the intent of parties in deeds and contracts is much regarded by the law, yet it cannot take place against the rules of law.

INTENDMENT of Crimes ; this, in case of treason, where the intention is proved by circumstances, is punishable in the same manner as if it was put in execution. So, if a person enter a house in the night-time, with an intent to commit burglary, it is felony ; also, an assault, with an intent to commit a robbery on the highway, is made felony, and punished with transportation, 7 Geo. II. c. 21.

INTENT, in the civil law, signifies to begin, or commence, an action or process.

INTENTION, in medicine, that judgment, or method of cure, which a physician forms to himself from a due examination of symptoms.

INTENTION, in physics, the increase of the power, or energy of any quality, as heat, cold, &c. By which it stands opposed to *remission*, which signifies its decrease or diminution.

INTENTION, in metaphysics, denotes an exertion of the intellectual faculties with more than ordinary vigour ; when the mind with earnestness fixes its view on any idea, considers it on all sides, and will not be called off by any solicitation.

INTERCALARY, an appellation given to the odd day inserted in leap-year ; which was so called from *calo, calare*, " to proclaim," it being proclaimed by the priests with a loud voice.

INTERCOLUMNIATION, in architecture, denotes the space between two columns, which is always to be proportioned to the height and bulk of the columns.

INTERCOSTAL, in anatomy, an appellation given to such muscles, nerves, arteries, and veins, as lie between the ribs.

INTERDICT, an ecclesiastical censure, by which the church of Rome forbids the performance of divine service in a kingdom, province, town, &c. This censure has been frequently executed in France, Italy, and Germany ; and in the year 1170, pope Alexander III. put all England under an interdict, forbidding the clergy to perform any part of divine service, except baptizing of infants, taking confessions, and giving ab-

solution to dying penitents. But this censure being liable to the ill consequences of promoting libertinism and a neglect of religion, the succeeding popes have very seldom made use of it.

There was also an interdict of persons, who were deprived of the benefit of attending on divine service. Particular persons were also anciently interdicted of fire and water, which signified a banishment for some particular offence : by their censure no person was allowed to receive them, or allow them fire or water ; and being thus wholly deprived of the two necessary elements of life, they were doubtless under a kind of civil death.

INTEREST, is the premium or money paid for the loan or use of other money. See **ARITHMETIC**, n^o 20.

Many good and learned men have in former times very much perplexed themselves and other people by raising doubts about the legality of interest in *foro conscientie*. It may not be amiss here to inquire upon what grounds this matter does really stand.

The enemies to interest in general make no distinction between that and usury, holding any increase of money to be indefensibly usurious. And this they ground as well on the prohibition of it by the law of Moses among the Jews, as also upon what is laid down by Aristotle ; That money is naturally barren ; and to make it breed money is preposterous, and a perversion of the end of its institution, which was only to serve the purposes of exchange, and not of increase. Hence the school-divines have branded the practice of taking interest, as being contrary to the divine law both natural and revealed ; and the canon law has prescribed the taking any the least increase for the loan of money as a mortal sin.

But, in answer to this, it may be observed, that the Mosaic precept was clearly a political, and not a moral, precept. It only prohibited the Jews from taking usury from their brethren the Jews ; but in express words permitted them to take it of a stranger : which proves that the taking of moderate usury, or a reward for the use, for so the word signifies, is not *malum in se*, since it was allowed where any but an Israelite was concerned. And as to Aristotle's reason, deduced from the natural barrenness of money, the same may with equal force be alleged of houses, which never breed houses ; and twenty other things, which nobody doubts it is lawful to make profit of, by letting them to hire. And though money was originally used only for the purposes of exchange, yet the laws of any state may be well justified in permitting it to be turned to the purposes of profit, if the convenience of society (the great end for which money was invented) shall require it. And that the allowance of moderate interest tends greatly to the benefit of the public, especially in a trading country, will appear from that generally acknowledged principle, that commerce cannot subsist without mutual and extensive credit. Unless money therefore can be borrowed, trade cannot be carried on : and if no premium were allowed for the hire of money, few persons would care to lend it ; or at least the ease of borrowing at a short warning (which is the life of commerce) would be entirely at an end. Thus, in the dark ages of monkish superstition and civil tyranny, when interest was laid under a total interdict,

Interest.

terdict, commerce was also at its lowest ebb, and fell entirely into the hands of the Jews and Lombards: but when mens minds began to be more enlarged, when true religion and real liberty revived, commerce grew again into credit; and again introduced with itself its inseparable companion, the doctrine of loans upon interest.

And, really, considered abstractedly from this its use, since all other conveniences of life may be either bought or hired, but money can only be hired, there seems no greater impropriety in taking a recompense or price for the hire of this, than of any other convenience. If one borrow 100*l.* to employ in a beneficial trade, it is but equitable that the lender should have a proportion of the gains. To demand an exorbitant price is equally contrary to conscience, for the loan of a horse, or the loan of a sum of money: but a reasonable equivalent for the temporary inconvenience which the owner may feel by the want of it, and for the hazard of his losing it entirely, is not more immoral in one case than it is in the other. And indeed the absolute prohibition of lending upon any, even moderate interest, introduces the very inconvenience which it seems meant to remedy. The necessity of individuals will make borrowing unavoidable. Without some profit by law, there will be but few lenders: and those principally bad men, who will break thro' the law, and take a profit; and then will endeavour to indemnify themselves from the danger of the penalty, by making that profit exorbitant. Thus, while all degrees of profit were discontinued, we find more complaints of usury, and more flagrant instances of oppression than in modern times when money may be easily had at a low interest. A capital distinction must therefore be made between a moderate and exorbitant profit; to the former of which we usually give the name of *interest*, to the latter the truly odious appellation of *usury*: the former is necessary in every civil state; if it were but to exclude the latter, which ought never to be tolerated in any well-regulated society. For, as the whole of this matter is well summed up by Grotius, "if the compensation allowed by law does not exceed the proportion of the hazard run, or the want felt, by the loan, its allowance is neither repugnant to the revealed nor to the natural law; but if it exceeds those bounds, it is then oppressive usury; and tho' the municipal laws may give it impunity, they never can make it just."

We see, that the exorbitance or moderation of interest, for the money lent, depends upon two circumstances; the inconvenience of parting with it for the present, and the hazard of losing it entirely. The inconvenience to individual lenders can never be estimated by laws; the rate therefore of general interest must depend upon the usual or general inconvenience. This results entirely from the quantity of specie or current money in the kingdom: for, the more specie there is circulating in any nation, the greater superfluity there will be, beyond what is necessary to carry on the business of exchange and the common concerns of life. In every nation, or public community, there is a certain quantity of money thus necessary; which a person well skilled in political arithmetic might perhaps calculate as exactly, as a private banker can the demand for running cash in his own shop: all above this necessary

quantity may be spared, or lent, without much inconvenience to the respective lenders; and the greater this national superfluity is, the more numerous will be the lenders, and the lower ought the rate of the national interest to be: but where there is not enough, or barely enough, circulating cash, to answer the ordinary uses of the public, interest will be proportionably high; for lenders will be but few, as few can submit to the inconvenience of lending.

So also the hazard of an entire loss has its weight in the regulation of interest: hence, the better the security, the lower will the interest be; the rate of interest being generally in a compound ratio, formed out of the inconvenience, and the hazard. And as, if there were no inconvenience, there should be no interest but what is equivalent to the hazard; so, if there were no hazard, there ought to be no interest, save only what arises from the mere inconvenience of lending. Thus, if the quantity of specie in a nation be such, that the general inconvenience of lending for a year is computed to amount to three *per cent.* a man that has money by him will perhaps lend it upon good personal security at five *per cent.* allowing two for the hazard run; he will lend it upon landed security, or mortgage, at four *per cent.* the hazard being proportionably less; but he will lend it to the state, on the maintenance of which all his property depends, at three *per cent.* the hazard being none at all.

But sometimes the hazard may be greater, than the rate of interest allowed by law will compensate. And this gives rise to the practice, 1. Of bottomry, or *respondentia*. 2. Of policies of insurance. See BOTTOMRY, and INSURANCE.

Upon the two principles of inconvenience and hazard, compared together, different nations have at different times established different rates of interest. The Romans at one time allowed *centesime*, one *per cent.* monthly, or twelve *per cent.* *per annum*, to be taken for common loans; but Justinian reduced it to *trienter*, or one third of the *as* or *centesima*, that is, four *per cent.*; but allowed higher interest to be taken of merchants, because there the hazard was greater. So too Grotius informs us, that in Holland the rate of interest was then eight *per cent.* in common loans, but twelve to merchants. Our law establishes one standard for all alike, where the pledge or security itself is not put in jeopardy; lest, under the general pretence of vague and indeterminate hazards, a door should be opened to fraud and usury: leaving specific hazards to be provided against by specific insurances, or by loans upon *respondentia*, or bottomry. But as to the rate of legal interest, it has varied and decreased for 200 years past, according as the quantity of specie in the kingdom has increased by accessions of trade, the introduction of paper-credit, and other circumstances. The statute 37 Hen. VIII. c. 9. confined interest to ten *per cent.* and so did the statute 13 Eliz. c. 8. But as, through the encouragements given in her reign to commerce, the nation grew more wealthy; so, under her successor, the statute 21 Jac. 1. c. 17. reduced it to eight *per cent.*; as did the statute 12 Car. II. c. 13. to six: and lastly, by the statute 12 Ann. st. 2. c. 16. it was brought down to five *per cent.* yearly, which is now the extremity of legal interest that can be taken. But yet, if a contract which carries interest be made in a foreign

Interjection
||
Interpreter.

foreign country, our courts will direct the payment of interest according to the law of that country in which the contract was made. Thus Irish, American, Turkish, and Indian interest, have been allowed in our courts to the amount of even 12 *per cent.* For the moderation or exorbitance of interest depends upon local circumstances; and the refusal to enforce such contracts would put a stop to all foreign trade. And, by stat. 14 Geo. III. c. 79. all mortgages and other securities upon estates or other property in Ireland or the plantations, bearing interest not exceeding six *per cent.* shall be legal; though executed in the kingdom of Great Britain: unless the money lent shall be known at the time to exceed the value of the thing in pledge; in which case also, to prevent usurious contracts at home under colour of such foreign securities, the borrower shall forfeit treble the sum so borrowed.

INTERJECTION, in grammar, an indeclinable part of speech, signifying some passion or emotion of the mind. See **GRAMMAR**.

INTERIM, a name given to a formulary, or kind of confession of the articles of faith, obtruded upon the Protestants after Luther's death by the emperor Charles V. when he had defeated their forces; so called because it was only to take place in the *interim* (mean time) till a general council should have decided all points in dispute between the Protestants and Romanists. It retained most of the doctrines and ceremonies of the Romanists, excepting that of marriage, which was allowed to the clergy, and communion to the laity under both kinds. Most of the Protestants rejected it. There were two other interims; one of Leipfic, the other of Franconia.

INTERLOCUTOR, in Scots law. The sentence or judgment of a court of law, is commonly called an *interlocutor* before decree is extracted.

INTERLOPERS, are properly those who, without due authority, hinder the trade of a company or corporation lawfully established, by dealing in the same way.

INTERLUDE, an entertainment exhibited on the theatre between the acts of a play, to amuse the spectators while the actors take breath and shift their dresses, or to give time for changing the scenes and decorations.

INTERMITTENT, or **INTERMITTING**, *Fever*, such fevers as go off and soon return again, in opposition to those which are continual. See (the *Index* subjoined to) **MEDICINE**.

INTERPOLATION, among critics, denotes a spurious passage inserted into the writings of some ancient author.

INTERPOSITION, the situation of a body between two others, so as to hide them, or prevent their action.

The eclipse of the sun is occasioned by an interposition of the moon between the sun and us; and that of the moon by the interposition of the earth between the sun and moon. See **ECLIPSE**.

INTERPRETER, a person who explains the thoughts, words, or writings, of some other, which before were unintelligible.—The word *interpreter*, according to Isidore, is composed of the preposition *inter*, and *partes*, as signifying a person in the middle betwixt two parties, to make them mutually under-

stand each others thoughts: others derive it from *inter*, and *præ*, i. e. *sidejussor*; q. d. a person who serves as security between two others who do not understand one another.

There have been great debates about interpreting Scripture. The Romanists contend, that it belongs absolutely to the church: adding, that where the is silent, reason may be consulted; but where the speaks, reason is to be disregarded. The Protestants generally allow reason the sovereign judge, or interpreter; though some among them have a strong regard to synods, and others to the authority of the primitive fathers. Lastly, others have recourse to the Spirit within every person to interpret for them; which is what Bochart calls *arbitrius et personalis*.

INTERREGNUM, the time during which the throne is vacant in elective kingdoms; for in such as are hereditary, like ours, there is no such thing as an interregnum.

INTERREX, the magistrate who governs during an interregnum.

This magistrature was established in old Rome, and was almost as ancient as the city itself: after the death of Romulus there was an interregnum of a year, during which the senators were each interrex in their turn, five days a-piece.

After the establishment of consuls and a commonwealth, though there were no kings, yet the name and function of *interrex* was still preserved: for, when the magistrates were absent, or there was any irregularity in their election, or they had abdicated, so that the comitia could not be held; provided they were unwilling to create a dictator, they made an interrex, whose office and authority was to last five days; after which they made another. To the interrex was delegated all the regal and consular authority, and he performed all their functions. He assembled the senate, held comitia or courts, and took care that the election of magistrates was according to rules. Indeed at first it was not the custom of the interrex to hold comitia, at least we have no instance of it in the Roman history. The patricians alone had the right of electing an interrex; but this office fell with the republic, when the emperors made themselves masters of every thing.

INTERROGATION, or *Point of INTERROGATION*, in grammar, a character of this form (?) serving to denote a question.

INTERVAL, the distance or space between two extremes, either in time, or place. The word comes from the Latin *intervallum*, which, according to Isidore, signifies the space *inter fossam & murum*, "between the ditch and the wall:" others note, that the stakes or piles, driven into the ground in the ancient Roman bulwarks, were called *valla*; and the interstices or vacancy between them, *intervalla*.

INTERVAL, in music. The distance between any given sound and another, strictly speaking, is neither measured by any common standard of extension nor duration; but either by immediate sensation, or by computing the difference between the numbers of vibrations produced by two or more sonorous bodies, in the act of sounding, during the same given time. As the vibrations are slower and fewer during the same instant, for example, the sound is proportionally lower or graver; on the contrary, as during the same period the vibrations

Interregnum
||
Interval.

tions increase in number and velocity, the sounds are proportionably higher or more acute. An interval in music, therefore, is properly the difference between the number of vibrations produced by one sonorous body of a certain magnitude and texture and of those produced by another of a different magnitude and texture in the same time.

Intervals are divided into consonant and dissonant. A consonant interval is that whose extremes, or whose highest and lowest sounds, when simultaneously heard, coalesce in the ear, and produce an agreeable sensation called by Lord Kaimes a *tertium quid*. A dissonant interval, on the contrary, is that whose extremes, simultaneously heard, far from coalescing in the ear, and producing one agreeable sensation, are each of them plainly distinguished from the other, produce a grating effect upon the sense, and repel each other with an irreconcilable hostility. In proportion as the vibrations of different sonorous bodies, or of the same sonorous body in different modes, more or less frequently coincide during the same given time, the chords are more or less perfect, and consequently the intervals more or less consonant. When these vibrations never coincide at all in the same given time, the discord is consummate, and consequently the interval absolutely dissonant.

Intervals are not only divided according to their natures, but also with respect to their degrees. In this view, they are either enharmonic, chromatic, or diatonic. Of these therefore in their order, from the least to the greatest.

An enharmonic interval is what they call the *eighth part of a tone*, or the difference between a major and minor semitone generally distinguished by the name of a *comma*. Commas, however, are of three different kinds, as their quantities are more or less; but since these differences cannot be ascertained without long and intricate computations, it is not necessary for us to attempt an investigation, whose pursuit is so unpleasant, and whose result attended with so little utility. It has by musicians been generally called the *eighth part of a tone*; but they ought to have considered, that a comma is by no means the object of auricular perception, and that its estimate can only be formed by calculation. For a more minute disquisition of this matter, our readers may consult the article *COMMA* in the Musical Dictionary, or the article *MUSIC* in this Work, Notes *n* and *s*. A chromatic interval consists properly of a minor semitone, but may also admit the major. A diatonic interval consists of a semitone-major at least, but may consist of any number of tones within the octave. When an octave higher or lower is assumed, it is obvious that we enter into another scale which is either higher or lower, but still a repetition of the former degrees of sound.

Intervals again are either simple or compound. All the intervals within any one octave are simple; such as the second major or minor, the third, the fourth, the fifth, the sixth, the seventh, &c. of these afterwards. All intervals whose extremes are contained in different octaves, such as the ninth, the tenth, the eleventh, the twelfth, the thirteenth, the fourteenth, the fifteenth, &c. may be termed *compound intervals*.

The semitone either exactly or nearly divides the tone into two equal parts. In the theory of harmo-

nical computation three kinds of semitones are recognised, *viz.* the greatest, the intermediate, and the smallest semitone. But in practice, to which these explanations are chiefly adapted, the semitone is only distinguished into major and minor. The semitone major is the difference between the third major and the fourth, as E F. Its ratio is as 15 to 16, and it forms the least of all diatonic intervals.

The semitone minor consists of the difference between the third major and minor: it may be marked in the same degree by a sharp or a flat, and it only forms a chromatic interval; its ratio is as 24 to 25.

Though some distinction is made between these semitones by the manner of marking them, yet on the organ and harpsichord no distinction can be made; nor is there any thing more common for us than to say, that D sharp in rising is E flat in descending, and so through the whole diatonic above or below; besides, the semitone is sometimes major and sometimes minor, sometimes diatonic and sometimes chromatic, according to the different modes in which we compose or practise; yet in practice these are called *semitones* minor, which are marked by sharps or flats, without changing the degree; and semitones major are those which form the interval of a second.

With respect to the three semitones recognised in theory, the greatest semitone is the difference between a tone major and a semitone minor; and its ratio is as 25 to 27. The intermediate semitone is the difference between a semitone major and a tone major; and its ratio is as 128 to 135. In a word, the small semitone consists of the difference between the greatest and the intermediate semitone; and its ratio is as 125 to 128.

Of all these intervals, there is only the semitone major, which is sometimes admitted as a second in harmony.

The interval of a tone which characterises the diatonic species of composition, is either major or minor. The former consists of the difference between the fourth and fifth; and its ratio is as 8 to 9: and the latter, whose ratio is as 9 to 10, results from the difference between the third minor and the fourth.

Seconds are distinguished into four kinds; two of which are not in practice sufficiently momentous to be mentioned. The second major is synonymous with the interval of a tone; but as that tone may be either major or minor, its ratio may be either as 8 to 9, or as 9 to 10.

The second minor consists of the distance from B to C, or from E F; and its ratio is as 15 to 16.

The third is so called, because it consists of two gradations, or three diatonic sounds, as from G to B ascending, or from A to C, inclusive of the extremes; of which the first is a third major, composed of two full tones, and its ratio as 4 to 5; the second, a third minor consisting of a tone and a semitone major, and its ratio as 5 to 6.

The fourth has by some been reckoned an imperfect, but more justly by others a perfect, chord. It consists of three diatonic degrees, but takes its name from the four different sounds of which it is formed; or, in other words, the number by which it is denominated includes the extremes. It is composed of a tone major, a tone minor, and a semitone major, as from C to F ascending; its ratio as 3 to 4.

Interval.

The fifth next to the octave, is perhaps the most perfect interval, as least susceptible of alteration. The number from whence it assumes its name likewise includes its extremes. It consists of two tones major, one minor, and a semitone major, as from A to E ascending; its ratio is as 2 to 3.

The sixth is not found among the natural order of consonances, but only admitted by combination. It is not here necessary to mention its various distinctions and uses, as we only give an account of intervals in general.

The sixth major consists of four tones and a semitone major, as from G to E ascending; its ratio is as 3 to 5. The sixth minor contains three tones and two semitones major, as from E to C ascending; its ratio is as 5 to 8.

The seventh, as a reduplication of the second, is a dissonance. When major, it consists diatonically of five tones, three major, and two minor, and a major semitone, as from C to B ascending; its ratio is as 8 to 15.

When minor, it consists of four tones, three major and one minor, and two major semitones, as from E to D ascending; its ratio is as 5 to 9.

The octave is the most perfect of all chords, and in many cases hardly to be distinguished by the ear from an unison; that is to say, from that coincidence of sound produced by two musical strings, whose matter, lengths, diameters, and tensions, are the same. As the vibrations of two strings in unison during any given time, are precisely coincident; so whilst the lowest extreme of the octave vibrates once, the highest vibrates twice; and consequently its ratio is as 1 to 2, as from c to C ascending. It consists of six full tones and two semitones major. Its name is derived from the Latin *octo*, "eight;" because that number likewise includes its extremes. It may likewise be divided into twelve semitones. It contains the whole diatonic scale; and every series above or below consists only of the same returning sounds. From whence the natures, distances, and powers, of every interval greater than the octave, as the ninth, the tenth, the eleventh, the twelfth, the thirteenth, the fourteenth, the fifteenth, the triple octave, &c. may easily be computed.

During our past observations upon the term *interval*, we have either wholly neglected our faithful associate M. Rousseau, or only maintained a distant and momentary intercourse with him. We now propose to pay him a more permanent and familiar visit; but as he is engaged in the dispute between the Pythagoreans and Aristoxenians, we think it more advantageous to decline the controversy, and to follow him, after having escaped the fray, like a gentleman and a scholar. Having put the partizans of Aristoxenus to silence, let us, with him, forsake the lists of combat, nor stain his triumph by insulting the falling champions.

"We divide, (says he), as did the ancients, intervals into consonant and dissonant. The consonances are perfect or imperfect *; dissonances are either such by nature, or become such by accident. There are only two intervals naturally dissonant, viz. the second and seventh, including their octaves or replications; nay, still these two may be reduced to one a-

lone, as the seventh is properly no more than a replication of the second; for B, the seventh above the lowest C, where we have generally begun the scale, is really an octave above B, the note immediately below that C; and consequently the interval between these lower sounds is no more than that of a second major, to which all dissonances may therefore be ultimately reduced, whether considered as major or minor; but even all the consonances may become dissonant by accident. See DISCORD.

"Besides, every interval is either simple or reduplicated. Simple intervals are such as the limits of a single octave comprehend. Every interval which surpasses this extent is reduplicated; that is to say, compounded of one or more octaves, and of the simple interval whose replication it is.

"Simple intervals are likewise divided into direct and inverted. Take any simple interval whatever for a direct one; the quantity which, added to itself, is required to complete the octave, will be found an inverted interval; and the same observation holds reciprocally true of such as are inverted.

"There are only six kinds of simple intervals; of which three contain such quantities, as, added to the other three, are required to complete the octave; and of consequence likewise the one must be inversions of the other. If you take at first the smallest intervals, you will have, in the order of direct intervals, the second, the third, and fourth; for inverted, the seventh, the sixth, and fifth. Suppose these to be direct, the others will be inverted; every thing here is reciprocal.

"To find the name of any interval whatever, it is only necessary to add the denomination of unity to the degree which it contains. Thus the interval of one degree shall give a second; of two, a third; of three, a fourth; of seven, an octave; of nine, a tenth, &c. But this is not sufficient to determine an interval with accuracy; for under the same name it may be either major or minor, true or false, diminished or redundant.

"The consonances which are imperfect, and the two natural dissonances, may be major or minor; which, without changing their degree, occasions in the interval the difference of a semitone: so that if, from a minor interval, we still deduce a semitone, it becomes an interval diminished; if, by a semitone, we increase a major interval, it becomes an interval redundant.

"The perfect consonances are by their nature invariable. When their intervals are such as they ought to be, we call them *just*, or *true*: and if we dilate or contract this interval by a semitone, the consonance is termed *false*, and becomes a dissonance; *redundant*, if the semitone be added; *diminished*, if it be abstracted. We improperly give the name of a *false fifth* to the fifth diminished; this is taking the genus for the species: the fifth redundant is every jot as false as the diminished, it is even more so in every respect."

In the Musical Dictionary, plate C, fig. 2. may be seen a table of all the simple intervals practicable in Music, with their names, their degrees, their values and their ratios.

Having ascertained the distinction between major and minor intervals, it is only necessary to add, that these

Interval.

* See
Consonance

Intestate
||
Intrigue.

these may be natural or artificial. Of the natural we have already given some account, by ascertaining the distances and ratios of such as have been mentioned. Of the artificial, we may observe, that they are such as change their position from what it naturally is in the diatonick scale, to what the convenience of composition or transposition requires it to be. A note thus artificially heightened by a semitone, together with the character which expresses that elevation, is called a *sharp*; on the contrary, a note artificially depressed by a semitone, together with the character by which that depression is signified, is called a *flat*. The character which restores a note thus depressed or raised to its primary state, is called a *natural*. Major or minor intervals, as they prevail, characterise the major or minor mode. See *MODE*.

This subject is sufficiently explained in the article *MUSIC*, Chap. IV.

INTESTATE, in law, a person that dies without making a will.

INTESTINES, in anatomy. See there, n° 354.

INTESTINAL, something belonging to or seated in the intestines.

INTONATION, in music, the action of founding the notes in the scale with the voice, or any other given order of musical tones. Intonation may be either true or false, either too high or too low, either too sharp or too flat; and then this word *intonation*, attended with an epithet, must be understood concerning the manner of performing the notes.

In executing an air, to form the sounds, and preserve the intervals as they are marked with justness and accuracy, is no inconsiderable difficulty, and scarcely practicable, but by the assistance of one common idea, to which, as to their ultimate test, these sounds and intervals must be referred. these common ideas are those of the key, and the mode in which the performer is engaged; and from the word *tone*, which is sometimes used in a sense almost identical with that of the key, the word *intonation* may perhaps be derived. It may also be deduced from the word *diatonic*, as in that scale it is most frequently conversant; a scale which appears most convenient and most natural to the voice. We feel more difficulty in our intonation of such intervals as are greater or lesser than those of the diatonick order; because, in the first case, the glottis and vocal organs are modified by gradations too large; or too complex, in the second.

INTRENCHMENT, in the military art, any work that fortifies a post against an enemy who attacks. It is generally taken for a ditch or trench with a parapet. Intrenchments are sometimes made of fascines with earth thrown over them, of gabions, hogheads, or bags filled with earth, to cover the men from the enemy's fire.

INTRIGUE, an assemblage of events or circumstances, occurring in an affair, and perplexing the persons concerned in it. In this sense, it is used to signify the nodus or plot of a play or romance; or that point wherein the principal characters are most embarrassed through the artifice and opposition of certain persons, or the unfortunate falling out of certain accidents and circumstances.

In tragedy, comedy, or an epic poem, there are always two designs. The first and principal is that of

the hero of the piece: the second contains the designs of all those who oppose him. These opposite causes produce opposite effects, to wit, the efforts of the hero for the execution of his design, and the efforts of those who thwart it. As those causes and designs are the beginning of the action, so these efforts are the middle, and there form a knot or difficulty which we call the *intrigue*, that makes the greatest part of the poem. It lasts as long as the mind of the reader or hearer is suspended about the event of those opposite efforts: the solution or catastrophe commences when the knot begins to unravel and the difficulties and doubts begin to clear up.

The intrigue of the *Iliad* is twofold. The first comprehends three days fighting in Achilles's absence, and consists on the one side in the resistance of Agamemnon and the Greeks, and on the other in the inexorable temper of Achilles. The death of Patroclus unravels this intrigue, and makes the beginning of a second. Achilles resolves to be revenged, but Hector opposes his design; and this forms the second intrigue, which is the last day's battle.

In the *Æneid* there are also two intrigues. The first is taken up in the voyage and landing of Æneas in Italy; the second is his establishment there: the opposition he met with from Juno in both these undertakings, forms the intrigue.

As to the choice of the intrigue, and the manner of unravelling it, it is certain they ought both to spring naturally from the ground and subject of the poem. Bossu gives us three manners of forming the intrigue of a poem: the first is that already mentioned; the second is taken from the fable and design of the poet; in the third the intrigue is so laid, as that the solution follows from it of course.

INTRINSIC, a term applied to the real and genuine values and properties, &c. of any thing, in opposition to their *extrinsic* or *apparent* values.

INTRODUCTION, in general, signifies any thing which tends to make another in some measure known before we have leisure to examine it thoroughly; and hence it is used on a great variety of occasions. Thus we speak of the introduction of one person to another; the introduction to a book, &c.—It is also used to signify the actual motion of any body out of one place into another, when that motion has been occasioned by some other body.

INTRODUCTION, in oratory. See *ORATORY*, n° 26.

INTUITION, among logicians, the act whereby the mind perceives the agreement or disagreement of two ideas, immediately by themselves, without the intervention of any other; in which case the mind perceives the truth as the eye does the light, only by being directed towards it. See *LOGIC*, n° 25. 27.

INVECTED, in heraldry, denotes a thing fluted or furrowed. See *HERALDRY*, Plate CXLIV. fig. 1. (A.)

INVECTIVE, in rhetoric, differs from reproach, as the latter proceeds from a friend, and is intended for the good of the person reproved; whereas the invective is the work of an enemy, and entirely designed to vex and give uneasiness to the person against whom it is directed.

INVEGES (Augustin), a learned Sicilian Jesuit, wrote in Italian an History of the city of Palermo,

Intrigue
||
Inveges.

Inverary and other works, which are esteemed. He died in 1677, aged 82.

INVERARY, a parliament town of Scotland, in Argyleshire, seated on Loch-fa in W. Long. 5. 0. N. Lat. 47. 3.—Here is a castle, the principal feat of the dukes of Argyle, chief of the Campbells. It was built by duke Archibald; is quadrangular, with a round tower at each corner; and in the middle rises a square one glazed on every side to give light to the staircase and galleries, which has from without a most disagreeable effect. This castle is built of a coarse *lapis ollaris* brought from the other side of Loch-fa; and is of the same kind with that found in Norway, of which the king of Denmark's palace is built. The founder of the castle designed to have built a new town on the west side of the little bay on which the house stands: he finished a few houses, a custom-house, and an excellent inn; but his death put a stop to the conclusion of the plan; which, when brought to perfection, will give the place a very different appearance from what it now bears; the old town being composed of the most wretched hovels that can be imagined.

INVERKEITHING, a parliament-town of Scotland, in the county of Fife, situated on the northern shore of the Frith of Forth, in W. Long. 3. 15. N. Lat. 56. 5. It was much favoured by William, who granted its first charter. He extended its liberties considerably, and in the time of David I. it became a royal residence. The Moubrays had large possessions here, which were forfeited in the reign of Robert II. The Franciscans had a convent in this town; and, according to Sir Robert Sibbald, the Dominicans had another.

INVERLOCHY, or **FORT WILLIAM**, a fortress erected in the Highlands of Scotland in king William's time. Even prior to that, however, there had been a small fortress erected by general Monk. The present fort is a triangle, has two bastions, and is capable of admitting a garrison of 800 men. It was well defended in 1746 against the rebels, who raised the siege with much disgrace. It was also attempted by those of 1715, but without success. The fort lies on a narrow arm of the sea called *Lochiel*, which extends some miles higher up the country, making a bend to the north; and extends likewise westward towards the isle of Mull, or near 24 Scotch miles.

This fort on the west, Fort Augustus in the centre, and Fort George on the east, form what is called the *chain* from sea to sea. This space is called *glen-more*, or the *great glen*, which, including water and land, is almost a level of 70 miles. There is in fact little land, but what is divided by a frith, loch, or river; except two miles which lie between Loch-och and Loch-lochy, called *Lagan-achadrom*. By means of Fort-George all entrance up the Frith towards Inverness is prevented. Fort-Augustus curbs the inhabitants midway, and Fort-William is a check to any attempts in the west. Detachments are made from all these garrisons to Inverness, Bernera barracks opposite to the isle of Skie, and castle Duart in the isle of Mull. Other small parties are also scattered in huts throughout the country, to prevent the stealing of cattle.—Fort William is surrounded by vast mountains, which occasions almost perpetual rain. Beneath soars above the rest,

and ends in a point laid to be 1450 yards above the level of the sea. The fort stands in W. Long. 5. 15. N. Lat. 56. 55.

INVERNESS, a town of Scotland, and capital of a county of the same name, finely seated on the river Ness, over which there is a stone bridge of seven arches, in W. Long. 4°. N. Lat. 57. 36. It is large, well built, and very populous, being the last town of any note in Britain. As there are always regular troops in its neighbourhood, there is a great air of politeness, a plentiful market, and more money and business stirring than could have been expected in such a remote part of the island. The country in the neighbourhood is remarkably well cultivated; and its produce clearly shews, that the soil and climate are not despicable. There is a profitable salmon-fishery; which, however, might be improved in many respects. They have also some branches both of the woollen and linen manufacture; and, in consequence of their excellent military roads, a great proportion of inland trade. But, besides all this, Inverness is a port with 20 creeks dependent upon it, part on the Murray Frith to the east, and part on the north of the town, reaching even the fourth border of the county of Caithness; yet the foreign commerce here is far from being extensive. There are indeed some few merchants in the town, and some few ships belonging to it; but they are small in size, as well as few in number. The harbour too is none of the best, which induced the inhabitants to apply to the legislature upwards of 40 years ago, when they obtained a grant for 19 years; which, by another law, was continued for the space of 21 years farther; and, in consequence of this, they have made, and are still making, very considerable improvements.

INVERNESS-SHIRE, a county of Scotland, adjoining to Ross and Cromarty on the north; to Murray-land on the east, of which it includes a part; to Lorn, Braidalbin, and Athol, on the south; and on the west is washed by the Atlantic ocean. It extends 60 miles in length from east to west, and 55 where broadest, from south to north. It produces plenty of iron ore, has large woods of fir and oak, plenty of pasturage, and some corn. Here also is plenty of deer, hares, partridges, growle, and all sorts of game, whether fowls or quadrupeds. The hills and mountains feed numerous flocks of black cattle: the rivers and lakes, of which there is a great number, afford abundance of salmon, eels, and trout; and for sea-fish, there is hardly a district in Scotland so well provided.

INVERSE, is applied to a manner of working the rule of three. See **ARITHMETIC**, n° 13.

INVERSE, in music. See **INVERTED**.

INVERTED, in music, is derived from the Latin preposition *in*, and *vertere*, “to turn any thing a contrary way.” The analogy of this term, and its use in music, will appear more obvious from the sequel.

It signifies a change in the order of the notes which form a chord, or in the parts which compose harmony: which happens by substituting in the bass, those sounds which ought to have been in the upper part: an operation not only rendered practicable, but greatly facilitated, by the resemblance which one note has to another in different octaves; whence we derive the power of exchanging one octave for another with so much pro-

propriety and success, or by substituting in the extremes those which ought to have occupied the middle station; and *vice versa*.

It is certain, that in every chord there must be a fundamental and natural order, which is the same with that of its generation: but the circumstances of succession, taste, expression, the beauty of melody, and variety, the approximation of harmony, frequently oblige the composer to change that order by inverting the chords, and of consequence the disposition of the parts.

As three things may be arranged in six different orders, and four things in twenty-four; it would seem at first, that a perfect chord should be susceptible of six inversions, and a dissonant chord of twenty-four; since one is composed of four and the other of three sounds, and since inversion consists only in a transposition of octaves. But it must be observed, that in harmony all the different dispositions of acuter sounds are not reckoned as inversions, whilst the same sounds remain in the lower parts. Thus, these two orders of the perfect chord *ut mi sol*, or C E G, and *ut sol mi*, or C G E, are only taken for the same inversion, and only bear the same name; this reduces the whole of inversions of which a perfect chord is susceptible to three; that is to say, to as many inversions as the chord contains different sounds: for the replications of the same sound are here reckoned as nothing.

Every time, therefore, when the fundamental bass is heard in the lowest parts, or if the fundamental bass be retrenched, every time when the natural order is preserved in the chords, the harmony is direct. As soon as that order is changed, or as soon as the fundamental sounds, without being in the lower parts, are heard in some of the others, the harmony is *inverted*. It is an inversion of the chord, when the fundamental sound is transposed; it is likewise an inversion of the harmony, when the treble or any other part moves as the bass ought to have done.

Every where, where a direct chord can be well placed, its inversions will likewise be so with respect to the harmony; for it is still the same fundamental succession. Thus, at every note of the fundamental bass, it is in the power of the composer to arrange the chord at his pleasure, and of consequence every moment to produce different inversions; provided that he does not change the regular and fundamental succession; provided also, that the dissonances may always be prepared and resolved in the same parts where they are first heard, that the sensible note may always ascend, and that such false relations may be avoided as would be too harsh upon the ear in the same part. This is the key of these mysterious distinctions which composers have made between those chords where the treble is syncopated, and those in which the bass ought to be syncopated; as, for instance, between the ninth and the second: it is thus that in the first the chord is direct, and the dissonance in the treble; in the others, the chord is reversed, and the dissonance in the bass.

With respect to chords by supposition, greater precaution is necessary in inverting them. As the sound which they add to the bass is absolutely foreign to the harmony; it is often only tolerable there, on account of its vast distance from the other sounds, which renders the dissonance less harsh. But if these added

sounds should happen to be transposed in the higher parts, as it sometimes does; if this transposition be not performed with much art, it may produce a very bad effect; and never can this be happily practised without taking away some other sound from the chord. See, at the article *Accord* in the Musical Dictionary, the cases when *inversion* may be practised, and the choice of such as are proper.

The perfect knowledge of *inversion* depends on art and study alone: the choice is a different matter; to this an ear and a taste are necessary; experience of the different effects are likewise indispensable; and though the choice of inversions be indifferent with respect to the foundation of the harmony, it is by no means such in regard of the effect and expression. It is certain, that the fundamental bass is formed to support the harmony, and to prevail beneath. Every time therefore when the order is changed and the harmony inverted, there ought to be good reasons for it: without which, the composer will fall into the vice of our more recent music, where the melody of the treble is often like what the bass should be, and the bass always like that of the treble, where every thing is confounded, reversed, disordered, without any other reason than to subvert the established order, and to spoil the harmony.

INVESTIGATION, properly denotes the searching or finding out any thing by the tracks or prints of the feet; whence mathematicians, schoolmen, and grammarians, come to use the term in their respective researches.

INVESTING A PLACE, is when a general, having an intention to besiege it, detaches a body of horse to possess all the avenues; blocking up the garriſon, and preventing relief from getting into the place, till the army and artillery are got up to form the siege.

INVESTITURE, in law, a giving livery of seisin or possession. There was anciently a great variety of ceremonies used upon investitures; as at first they were made by a certain form of words, and afterwards by such things as had the greatest resemblance to the thing to be transferred: thus, where lands were intended to pass, a turf, &c. was delivered by the grantor to the grantee. In the church, it was customary for princes to make investiture of ecclesiastical benefices, by delivering to the persons they had chosen, a pastoral staff and a ring.

INULA, ELECAMpane; a genus of the polygamia superflua order, belonging to the syngenesia class of plants. There are 22 species, of which the helennium, or common elecampane, is the most remarkable. It is a native of Britain; but is cultivated in gardens for the sake of the root, which is used in medicine. The root is perennial, thick, branching, and of a strong odour. The lower leaves are eight or nine inches long, and four broad in the middle, rough on their upper side, but downy on the under side. The stalks rise about four feet high, and divide toward the top into several smaller branches, garnished with oblong oval leaves indented on their edges, ending in acute points. Each branch is crowned with one large yellow radiated flower, succeeded by narrow four-cornered seeds, covered with down. It may be propagated in autumn by seeds or offsets.

Medicinal Uses, &c. The root of elecampane, e-
spe.

Inundate specially when dry, has an agreeable aromatic smell; its taste, on chewing, is glutinous, and as it were somewhat rancid; in a little time it discovers an aromatic bitterness, which by degrees becomes considerably acrid and pungent. It possesses the general virtues of alexipharmacs; and is principally recommended for promoting expectoration in humoral asthma and coughs. Liberally taken, it is said to excite urine, and to loosen the belly. In some parts of Germany, large quantities of this root are candied, and used as a stomachic for strengthening the tone of the viscera in general, and for attenuating tenacious juices. Spirituous liquors extract its virtues in greater perfection than watery ones. The former scarce elevate any thing in distillation: with the latter an essential oil arises, which concretes into white flakes; this possesses at first the flavour of the elecampane, but is very apt to lose it in keeping. Outwardly applied, a decoction of it is said to cure the itch. The root bruised and macerated in urine with balls of ashes and whortleberries, dyes a blue colour.

INUNDATÆ, the name of the 15th order in Linneus's fragments of a natural method; consisting of plants which grow in the water. See **BOTANY**, p. 1307.

INVOCATION, in theology, the act of adoring God, and especially of addressing him in prayer for his assistance and protection. See the articles **ADORATION** and **PRAYER**.

The difference between the invocation of God and of the saints, as practised by the Papists, is thus explained in the catechism of the council of Trent. "We beg of God, (says the catechism,) to give us good things, and to deliver us from evil; but we pray to the saints, to intercede with God and obtain those things which we stand in need of. Hence we use different forms in praying to God, and to the saints: to the former we say, *hear us, have mercy on us*; to the latter we only say, *pray for us*." The council of Trent expressly teaches, that the saints who reign with Jesus Christ offer up their prayers to God for men; and condemn those who maintain the contrary doctrine. The Protestants reject and censure this practice as contrary to scripture, deny the truth of the fact, and think it highly unreasonable to suppose that a limited finite being should be in a manner omnipresent, and at one and the same time hear and attend to the prayers that are offered to him in England, China, and Peru; and from thence infer, that if the saints cannot hear their requests, it is inconsistent with common sense to address any kind of prayer to them.

INVOCATION, in poetry, an address at the beginning of a poem, wherein the poet calls for the assistance of some divinity, particularly of his muse, or the deity of poetry.

INUNDATION, a sudden overflowing of the dry land by the waters of the ocean, rivers, lakes, springs, or rain. See all these articles.

INVOICE, an account in writing of the particulars of merchandize, with their value, custom, charges, &c. transmitted by one merchant to another in a distant country.

INVOLUCRUM, among botanists. See **BOTANY**, p. 1293.

INVOLUTION, in algebra. See **ALGEBRA**, n° 9.

JOAB, general of the army of king David, defeated the Syrians and the other enemies of David, and took the fort of Zion from the Jebusites, who, thinking it impregnable, committed it to the care of the lame and blind, whom they placed on the walls. He signalized himself in all David's wars, but was guilty of basely murdering Abner and Amasa. He procured a reconciliation between Abalom and David; and afterwards slew Abalom, contrary to the express orders of the king. He at length joined Adonijah's party; and was put to death by the order of Solomon, 1014 B. C.

JOACHIMITES, in church-history, the disciples of Joachim a Cistercian monk, who was an abbot of Flora in Calabria, and a great pretender to inspiration.

The Joachimites were particularly fond of certain ternaries: The Father, they said, operated from the beginning till the coming of the Son; the Son, from that time to theirs, which was the year 1260; and from that time the Holy Spirit was to operate in his turn. They also divided every thing relating to men, to doctrine, and the manner of living, into three classes, according to the three persons in the Trinity: The first ternary was that of men; of whom the first class was that of married men, which lasted during the whole period of the Father; the second was that of clerks, which had lasted during the time of the Son; and the last was that of the monks, in which there was to be an uncommon effusion of grace by the Holy Spirit: The second ternary was that of doctrine, viz. the Old Testament, the New, and the everlasting Gospel; the first they ascribed to the Father, the second to the Son, and the third to the Holy Spirit: A third ternary consisted in the manner of living, viz. under the Father, men lived according to the flesh; under the Son, they lived according to the flesh and the spirit; and under the Holy Ghost, they were to live according to the spirit only.

JOAN (Pope), called by Platina *John VIII.* is said to have held the holy see between Leo IV. who died in 855, and Benedict III. who died in 858. Marianus Scotus says, she sat two years five months and four days. Numberless have been the controversies, fables, and conjectures, relating to this pope. It is said that a German girl, pretending to be a man, went to Athens, where she made great progress in the sciences; and afterward came to Rome in the same habit. As she had a quick genius, and spoke with a good grace in the public disputations and lectures, her great learning was admired, and every one loved her extremely; so that after the death of Leo, she was chosen pope, and performed all offices as such. Whilst she was in possession of this high dignity, she was got with child; and as she was going in a solemn procession to the Lateran church, she was delivered of that child, between the Coliseum and St Clement's church, in a most public street, before a crowd of people, and died on the spot, in 857. By way of embellishing this story, may be added the precaution reported to have been afterward taken to avoid such another accident. After the election of a pope, he was placed on a chair with an open seat, called the *groping chair*, when

Involution
Joan.

when a deacon came most devoutly behind and satisfied himself of the pontiff's sex by feeling. This precaution, however, has been long deemed unnecessary, because the cardinals now always get bastards enough to establish their virility before they arrive at the pontificate.

JOAN *d'Arc*, or the Maid of Orleans, whose heroic behaviour in reanimating the expiring valour of the French nation, though by the most superstitious means, (pretending to be inspired), deserved a better fate. She was burnt by the English as a sorceress, in 1421, aged 24. See FRANCE, n° 60.

JOANNA (St), one of the Comora islands in the Indian ocean, E. Long. 44. 25. S. Lat. 12. 0. The north side shoots out into two points, 26 miles asunder, between which there is a great bay. This island is a proper place of refreshment for the East India ships, whose crews, when ill of the scurvy, soon recover by the use of limes, lemons, and oranges, and from the air of the land. The island abounds with horned cattle, goats, fowls, rice, pepper, cocoa-nuts, plantains, bananas, oranges, lemons, limes, pine-apples, guavas, plums, yams, and potatoes. They have likewise honey and sugar-canes; and the soil is so rich, that it seems proper for any other vegetables: all these, except the cocoa-nuts, may be gathered at pleasure. The prospect of the country is exceeding beautiful, and may be called without exaggeration a *terrestrial paradise*; every valley being a delightful grove, and the hills covered with variety of evergreen trees, combined with water-falls and cascades, render it impossible that they should receive any addition from art. The town where the king resides is at the east side of the island; and though it is three quarters of a mile in length, it does not contain above 200 houses. However, the villages are thick, and there are cottages almost every where. Their principal houses are built with stone, with a quadrangle in the middle, and are only one story high. All the other houses, or rather huts, are slightly composed of plastered reeds; and yet the mosques are tolerable structures, very neat and clean in the inside. The horned cattle are a kind of buffaloes, having a large hump on their shoulders, which is very delicious eating. They have neither horses nor asses, nor beasts of prey; but they have monkeys of several sorts, and bats as large as a weasel; they have also various sorts of birds not yet distinguished by any particular name.

JOB, or *Book of Job*, a canonical book of the Old Testament, containing a narrative of a series of misfortunes which happened to a man whose name was *Job*, as a trial of his virtue and patience; together with the conferences he had with his cruel friends on the subject of his misfortunes, and the manner in which he was restored to ease and happiness. This book is filled with those noble, bold, and figurative expressions, which constitute the very soul of poetry.

Many of the Jewish rabbins pretend that this relation is altogether a fiction: others think it a simple narrative of a matter of fact, just as it happened: while a third sort of critics acknowledge, that the groundwork of the story is true, but that it is wrote in a poetical strain, and decorated with peculiar circum-

stances, to render the narration more profitable and entertaining.

The time is not set down in which Job lived. Some have thought that he was much antienter than Moses, because the law is never cited by Job or his friends, and because it is related that Job himself offered sacrifices. Some imagine that this book was wrote by himself; others say, that Job wrote it originally in Syriac or Arabic, and that Moses translated it into Hebrew: but the rabbins generally pronounce Moses to be the author of it, and many Christian writers are of the same opinion.

JOBBER, in law, a person that buys and sells cattle for others. Hence stock-jobbers are persons who buy and sell stocks for other persons.

JOBERT (Lewis), a pious and learned jesuit, born at Paris in 1647. He distinguished himself as a preacher; and besides several other tracts wrote a treatise entitled *La Science des Medailliers*, which is in good esteem. He died in 1719; and the best edition of this work is that of Paris in 1739, 2 vols 12mo.

JOELLE (Stephen), lord of Limodin, was born at Paris in 1532; and distinguished himself so greatly by his poetical talents, that he was reckoned one of the Pleiades celebrated by Ronfard. He is said to be the first Frenchman who wrote plays in his own language according to the ancient form. He was remarkably ready at composition, writing without study or labour; and was well skilled in polite arts and genteel exercises. In his younger years he embraced the reformed religion, and wrote a satire on the *mafs* in 100 Latin verses; yet all of a sudden returned to that *mafs* again. He died in 1579, very poor.

JOEL, the son of Phathuel, and the second of the lesser prophets, 800 B. C. foretold the captivity of Babylon, the descent of the Holy Ghost on the apostles, and the last judgment. His prophecy is in Hebrew, and contains only three chapters. The style is strong, expressive, and figurative.

JOHN (St), the BAPTIST, the fore-runner of Jesus Christ, was the son of Zacharias and Elizabeth. He retired into a desert, where he lived on locusts and wild honey; and about the year 29 began to preach repentance, and to declare the coming of the Messiah. He baptized his disciples, and the following year Christ himself was baptized by him, in the river Jordan. Some time after, having reproved Herod Antipas, who had a criminal correspondence with Herodias his brother Philip's wife, he was cast into prison, where he was beheaded. His head was brought to Herodias, who, according to St Jerome, pierced his tongue with the bodkin she used to fasten up her hair, to revenge herself after his death for the freedom of his reprofs.

JOHN (St), the apostle, or the evangelist, was the brother of St James the Great, and the son of Zebedee. He quitted the business of fishing to follow Jesus, and was his beloved disciple. He was witness to the actions and miracles of his Master; was present at his transfiguration on mount Tabor; and was with him in the garden of Olives. He was the only apostle who followed him to the cross; and to him Jesus left the care of his mother. He was also the first apostle who knew him again after his resurrection. He preached

John.

preached the faith in Asia; and principally resided at Ephesus, where he maintained the mother of our Lord. He is said to have founded the churches of Smyrna, Pergamus, Thyatira, Sardis, Philadelphia, and Laodicea. He is also said to have preached the gospel amongst the Parthians, and to have addressed his first epistle to that people. It is related, that, when at Rome, the emperor Domitian caused him to be thrown into a caldron of boiling oil, when he came out unhurt; on which he was banished to the isle of Patmos, where he wrote his Apocalypse. After the death of Domitian, he returned to Ephesus, where he composed his Gospel, about the year 96; and died there, in the reign of Trajan, about the year 100, aged 94.

Gospel of St JOHN, a canonical book of the New Testament, containing a recital of the life, actions, doctrine, and death, of our Saviour Jesus Christ, written by St John the apostle and evangelist.

St John wrote his Gospel at Ephesus, after his return from the isle of Patmos, at the desire of the Christians of Asia. St Jerome says, he would not undertake it, but on condition that they should appoint a public fast to implore the assistance of God; and that, the fast being ended, St John, filled with the Holy Ghost, broke out into these words, "In the beginning was the Word," &c. The ancients assign two reasons for this undertaking: the first is, because, in the other three Gospels, there was wanting the history of the beginning of Jesus Christ's preaching, till the imprisonment of John the Baptist, which therefore he applied himself particularly to relate. The second reason was, in order to remove the errors of the Corinthians, Ebionites, and other sects.

Revelation of St JOHN. See APOCALYPSE.

JOHN of Salisbury, bishop of Chartres in France, was born at Salisbury in Wiltshire, in the beginning of the 12th century. Where he imbibed the rudiments of his education, is unknown; but we learn, that in the year 1136, being then a youth, he was sent to Paris, where he studied under several eminent professors, and acquired considerable fame for his application and proficiency in rhetoric, poetry, divinity, and particularly in the learned languages. Thence he travelled to Italy; and, during his residence at Rome, was in high favour with pope Eugenio III. and his successor Adrian IV. After his return to England, he became the intimate friend and companion of the famous Thomas BECKET, archbishop of Canterbury, whom he attended in his exile, and is said to have been present when that haughty prelate was murdered in his cathedral. What preferment he had in the church during this time, does not appear; but in 1176 he was promoted by king Henry II. to the bishopric of Chartres in France, where he died in 1182.

This John of Salisbury was really a phenomenon. He was one of the first restorers of the Greek and Latin languages in Europe; a classical scholar, a philosopher, a learned divine, and an elegant Latin poet. He wrote several books; the principal of which are, his *Life of St Thomas of Canterbury*, a collection of letters, and *Polycation*.

Pope JOHN XXII. a native of Cahors, before called

James d'Esse, was well skilled in the civil and canon law; and was elected pope after the death of Clement V. on the 7th of August 1316. He published the constitutions called *Clementines*, which were made by his predecessor; and drew up the other constitutions called *Extravagantes*. Lewis of Bavaria being elected emperor, John XXII. opposed him in favour of his competitor; which made much noise, and was attended with fatal consequences. That prince, in 1329, caused the antipope Peter de Corbiera, a cordelier, to be elected, who took the name of Nicholas V. and was supported by Michael de Cefenne, general of his order; but that antipope was the following year taken and carried to Avignon, where he begged pardon of the pope with a rope about his neck, and died in prison two or three years after. Under this pope arose the famous question among the cordeliers, called *the bread of the cordeliers*; which was, Whether those monks had the property of the things given them, at the time they were making use of them? for example, Whether the bread belonged to them when they were eating it, or to the pope, or to the Roman church? This frivolous question gave great employment to the pope; as well as those which turned upon the colour, form, and stuff of their habits, whether they ought to be white, grey, or black; whether the cowl ought to be pointed or round, large or small; whether their robes ought to be full, short, or long; of cloth, or of serge, &c. The disputes on all these minute trifles were carried so far between the minor brothers, that some of them were burned upon the occasion. He died at Avignon in 1334, aged 90.

JOHN, king of England. See ENGLAND, n° 133, 144.

JOHN of Gaunt, duke of Lancaster, a renowned general, father of Henry IV. king of England, died in 1438.

JOHN of Leyden, otherwise called *Buccold*. See ANABAPTISTS.

JOHN Sobieski of Poland, one of the greatest warriors in the 17th century, was, in 1665, made grand-marshal of the crown; and, in 1667, grand-general of the kingdom. His victories obtained over the Tartars and the Turks procured him the crown, to which he was elected in 1674. He was an encourager of arts and sciences, and the protector of learned men. He died in 1696, aged 72.

St JOHN's Day, the name of two Christian festivals; one observed on June 24th, kept in commemoration of the wonderful circumstances attending the birth of John the Baptist; and the other on December 27th, in honour of St John the evangelist.

St JOHN's Wort. See HYPERICUM.

JOHN's (St), an island of the East-Indies, in Asia, and one of the Philippines, east of Mindanayo, from which it is separated by a narrow strait. E. Long. 125. 25. N. Lat. 7. 0.

JOHN's (St), an island of North-America, in the bay of St Lawrence, having New-Scotland on the south and west, and Cape Breton on the east. The English got possession of it when Louisbourg was surrendered to them, on July 26, 1758.

JOHNSON (Ben), one of the most considerable dramatic poets of the last age, whether we consider the number or the merit of his productions. He was born

John
||
Johnson.

born at Westminster in 1574, and was educated at the public school there under the great Camden. He was descended from a Scots family; and his father, who lost his estate under Queen Mary, dying before our poet was born, and his mother marrying a bricklayer for her second husband, Ben was taken from school to work at his father-in-law's trade. Not being captivated with this employment, he went into the Low Countries, and distinguished himself in a military capacity.

On his return to England, he entered himself at St John's college, Cambridge; and having killed a person in a duel, was condemned, and narrowly escaped execution. After this he turned actor; and Shakespeare is said to have first introduced him to the world, by recommending a play of his to the stage, after it had been rejected. His Alchymist gained him such reputation, that in 1619 he was, at the death of Mr Daniel, made poet-laureat to King James I. and master of arts at Oxford.

As we do not find Johnson's economical virtues any where recorded, it is the less to be wondered at, that after this we find him petitioning king Charles, on his accession, to enlarge his father's allowance of 100 marks into pounds; and quickly after we learn, that he was very poor and sick, lodging in an obscure alley: on which occasion it was, that Charles, being prevailed on in his favour, sent him ten guineas; which Ben receiving, said, "His majesty has sent me ten guineas, because I am poor, and live in an alley; go and tell him, that his soul lives in an alley."

He died in August 1637, aged 63 years, and was buried in Westminster-Abbey.—The most complete edition of his works was printed in 1756, in 7 vols. 8vo.

JOHNSON (Samuel), an English divine, remarkable for his learning, and headiness in suffering for the principles of the revolution in 1688. He was born in 1649; and, entering into orders, obtained in 1670 the rectory of Corringham in the hundreds of Essex, worth no more than L. 80 a-year; which was the only church-preference he ever had. The air of this place not agreeing with him, he was obliged to place a curate on the spot, at the expence of half his income, while he settled at London; a situation much more to his liking, as he had a strong propensity to politics. The times were turbulent: the duke of York declaring himself a Papist, his succession to the crown began to be warmly opposed; and Mr Johnson, who was naturally of no submissive temper, being made chaplain to lord William Russell, engaged the ecclesiastical champion for passive obedience Dr Hicks, in a treatise intitled *Julian the apostate*, &c. published in 1682. He was answered by Dr Hicks in a piece intitled *Jovian*, &c. To which he drew up, and printed, a reply, under the title of *Julian's arts to undermine and extirpate Christianity*, &c.; but by the advice of his friends suppressed the publication. For this unpublished work he was committed to prison; but not being able to procure a copy, the court prosecuted him for writing the first tract, condemned him to a fine of 500 marks, and to lie in prison until it was paid. By the assistance of Mr Hamden, who was his fellow-prisoner, he was enabled to run into farther troubles; for on the encampment of the army on

Vol. V.

Hounslow-heath, in 1686, he printed and dispersed, *A humble and hearty address to all the Protestants in the present army*; for this he was sentenced to a second fine of 500 marks, to be degraded from the priesthood, to stand twice in the pillory, and to be whipped from Newgate to Tyburn. It happened luckily, that, in the degradation, they omitted to strip him of his cassock; which circumstance, slight as it may appear, rendered his degradation imperfect, and afterwards preserved his living to him. Intercession was made to get the whipping omitted; but James replied, "That since Mr Johnson had the spirit of martyrdom, it was fit he should suffer;" and he bore it with firmness, and even with alacrity. On the Revolution, the parliament resolved the proceedings against him to be null and illegal; and recommended him to the king, who offered him the rich deanery of Durham: but this he refused, as inadequate to his services and sufferings, which he thought to merit a bishopric. The truth was, he was passionate, self-opiniated, and turbulent; and though, through Dr Tillotson's means, he obtained a pension of 300 l. a-year, with other gratifications, he remained discontented; pouring forth all his uneasiness against a standing army, and the great favours shewn to the Dutch. He died in 1703, and his works were afterwards collected in one volume folio.

JOHNSON (John), a learned divine, born in 1662. He was zealous for the Revolution, and preached a noted sermon at Feverham on the occasion, from the words, "Remember Lot's wife;" wherein he set forth the great danger of looking back, and vindicated the liturgy against Mr Baxter and others. He published *The Clergyman's Vade Mecum*, and *A Collection of Ecclesiastical Laws* as a continuation of it; but catching the infection spread by Dr Sachaivel, he, on the accession of Geo. I. to the amazement of all his old friends, entertained unfavourable thoughts of the Protestant succession, and refused to read the usual prayers for the king. Being prosecuted, however, he thought proper to submit; and died vicar of Cranbrook in Kent, in 1725.

JOIGNY, a town of France, in Champagne, and in the diocese of Sens, with a very handsome castle. It consists of three parishes, and is pleasantly situated on the river Yonne, in E. Long. 3. 25. N. Lat. 47. 56.

JOINERY, the art of working in wood, or of fitting various pieces of timber together. It is called by the French *menuiserie*, "small work;" to distinguish it from carpentry, which is employed about large and less curious works.

JOINT, in general, denotes the juncture of two or more things. The joints of the human body are called by anatomists *articulations*. See ANATOMY, n° 2. b, c, d, e, f.

The suppleness to which the joints may be brought by long practice from the time of infancy, is very surprising. Every common posture-master shews us a great deal of this; but one of the most wonderful instances we ever had of it, was in a person of the name of Clark, and famous for it in London, where he was commonly known by the name of *Clark the posture-master*. This man had found the way, by long practice, to distort many of the bones, of which nobody

before had ever thought it possible to alter the position. He had such an absolute command of his muscles and joints, that he could almost disjoint his whole body; so that he once imposed on the famous Mullens by his distortions, in such a manner, that he refused to undertake his cure: but, to the amazement of the physician, no sooner had he given over his patient, than he saw him restore himself to the figure and condition of a proper man, with no distortion about him.

JOINTURE, in law, generally signifies a settlement of lands and tenements, made on a woman in consideration of marriage.

JOINVILLE (John Sire de), an eminent French statesman of the 13th century, who was seneschal or high-steward of Champagne, and one of the principal lords in the court of Lewis IX. He attended that monarch in all his expeditions; and had so much confidence placed in him, that all matters of justice in the palace were referred to his decision, and the king undertook nothing of consequence without consulting him. He wrote the history of St Lewis in French, which is a very curious and interesting piece; and died about the year 1318. The best edition of this work is that of Du Cange, in folio, with learned remarks.

JOINVILLE, an ancient and considerable town of France, in Champagne, with the title of a principality, and a large magnificent castle. It is situated on the river Marne, in E. Long. 5. 10. N. Lat. 48. 20.

JOISTS, or **JOYSTS**, in architecture, those pieces of timber framed into the girders and summers, on which the boards of the floor are laid.

IOLAUS, in fabulous history, the son of Iphicles, assisted Hercules in overcoming the hydra, by procuring and lighting firebrands, as fast as Hercules cut off its heads. As a reward for this piece of service, Hercules prevailed on Hebe to restore him to youth, when decrepited with age.

JOLI, or **JOLY**, (Claudius), a worthy parish-priest, and an excellent scholar, descended from a family eminent for learning and piety; was born at Paris in 1607. He applied himself first to the law, and pleaded for some time at the bar: but inclining afterwards to the church, he entered into orders, and in 1631 obtained a canonry in the cathedral church of Notre Dame at Paris; the duties of which office he discharged with an exactness beyond all example as long as he lived. Discovering at the same time occasionally a capacity for state-affairs, the duke de Longueville, the French plenipotentiary for negotiating a general peace, took Joly with him to Munster, where he proved a good assistant. On his return, he resumed his former employments with his usual zeal. In 1671 he was made precentor in his church; and several times official of Paris, without his seeking; always behaving, as an ecclesiastical magistrate, with perfect integrity, and testifying a sincere love for justice. He died in 1700, and left many works; in which, as in as many mirrors, his true character fully appears.

JOLI (Guy), king's counsellor to the Chatelet, and syndic of the revenues of the Hotel de Ville at Paris, attached himself for a long time to cardinal de Retz in the capacity of secretary. Beside other tracts, he wrote *Memoirs* from 1648 to 1665, including those

of Cardinal de Retz; a translation of which into English was published in 1755.

JONA, or **IONA**, the most celebrated of all the Hebrides, called also *St Columb-kill*, from St Columba *, who came hither from Ireland, and here lies buried. The island stretches two miles in length from south to north in the neighbourhood of Mull, and is about a mile broad from east to west. One end of it is rocky and barren; the other, plain, arable, and fruitful. Columba having converted the northern Picts by his preaching, their king is said to have bestowed upon him this island, where he erected two churches and two monasteries, and instituted a seminary that soon became famous for learning and sanctity. These foundations were richly endowed by the kings of Scotland and lords of the isles: Jona became the cathedral of the bishop of the isles; and, on account of its supposed sanctity, was chosen as a burying-place for kings, heroes, and churchmen. St Mary's church in this island is built in form of a cross, in the Gothic manner; on each side of the choir are two chapels, having, at the entrance, large pillars carved in basso-relievo: the steeple, doors, and windows, are adorned with curious fret-work; the altar is large, magnificent, and composed of fine polished marble.

Within the church several abbots are interred, and among these M'likeich, whose statue of black marble appears as big as the life, in an episcopal habit, with the mitre and crozier; the rest are represented in the same manner, and some distinguished by Latin inscriptions. Behind the church are the ruins of a cloister, library, and hall; in which last there used to be public disputations. At the west end of the church, in a little cell, we find the tomb of Columba, but undistinguished by any inscription. Hard by stands the cross of St Martin, an entire porphyry stone, eight feet high above the ground, standing on a pedestal, and exhibiting on the east side the figure of a tree, and on the west a large crucifix. At a little distance from hence we see the ruins of Dun-ni Manich, or Monks Fort, built of stone and lime; which seems to have been a kind of raised bastion, on which the monks enjoyed the cool air, and a prospect of the whole country. A little farther westward lie the black stones, so called, not for their colour, which is grey, but on account of the dreadful vengeance which was said to overtake all those who swore an oath on these stones and were afterwards guilty of perjury. Kneeling on these stones with uplifted hands, Macdonald, lord of the isles, confirmed the grants of lands to his adherents and vassals, solemnly swearing before witnesses, that he would never revoke the rights and privileges he then bestowed.

The other church in Jona is called *St Ouran's*, from the patron to which it is dedicated. The stateliest tomb in this church belongs to the laird of M'Kinnon. On the wall above appears a crucifix, engraved with the family-arms underneath. On the tomb-stone lies a statue as big as the life in armour, a ship under sail, a lion at the head, and another at the feet, with this inscription, *Hic est abbas Lachlan Much-fingon, et ejus filius, Abbatas de I. Etatis in Dno. Mo. CCCC. ann.* But the most remarkable spot is the cemetery on the south side, in which the king and chieftains lie buried under shrines. Each particular vault was distinguished

* See Hebrides, and Columba.

Jona
||
Jonas.Jonas
||
Jones.

ed by an inscription; but these are now not legible. In that on the right hand, four kings of Ireland were interred; on the left, eight kings of Norway lie buried; and in the middlemost, eight and forty kings of Scotland. Here are likewise the tombs of Macdonald of Ila, Gilbred, and Paul Sporran, ancient tribes of the same name; the Macleans of Duart, Lochbuy, and Coll, Macalister, likewise a branch of the Macdonalds, Mac-ourey of Ulway, and several distinguished clergymen; one of which exhibits this inscription, *Hic jacet Johanner Turnbull, quondam episcopus Cantuariensis*. All these monuments are of laymen,^a adorned with statues in armour, and armorial ensigns engraven in stone.

About a quarter of a mile farther south, is the church of Ronad, the burying-place of several abbesses; one of whom is thus inscribed: *Hic jacet Dna. Anna Tarleti, filia quondam priorisse de Jona, quæ obiit anno Mo. Christi, animam Abraham commendamus*. If this inscription be true, the prioresses in those days did not live a life of celibacy; though indeed a little alteration in the punctuation and orthography will destroy this supposition; for example, *Hic jacet Dna. Anna, Tarleti filia, quondam priorisse de Jona, &c.* In the middle of a long pavement belonging to the adjoining nunnery, stands another stone cross, called *Maclean's cross*, like that which we have already described. On the shore is a small dock dug to preserve the curich or boat, made of timber covered with hides, in which Columba is said to have transported himself and eighteen ecclesiastics from Ireland. One copy of this apostle's life, written in the Irish character, which by the by is no other than the old Saxon, was in the possession of John Macneil in the isle of Barra; and another in the hands of Macdonald of Benbecula. The monastery of Jona furnished divers bishops to the dioceses of Scotland and England; among others, the famous Aidanus, bishop of Lindisfarn, now Holy Island.

JONAH, or *Prophecy of JONAH*, a canonical book of the Old Testament; in which it is related, that Jonah (about 771 B. C.) was ordered to go and prophesy the destruction of the Ninevites, on account of their wickedness. But the prophet, instead of obeying the divine command, embarked for Tarshish; when, a tempest arising, the mariners threw him into the sea: he was swallowed by a great fish; and after being three days and nights in its belly, was cast upon the land. Hereupon being sensible of his past danger and surprising deliverance, he betook himself to the journey and embassy to which he was appointed; and arriving at Nineveh the metropolis of Assyria, he, according to his commission, boldly laid open their sins and miscarriages, and proclaimed their sudden overthrow: upon which the whole city, by prayer and fasting, and a speedy repentance, happily averted the divine vengeance, and escaped the threatened ruin. Jonah upon this, fearing to pass for a false prophet, retired to a hill at some distance from the city; where God, by a miracle, condescended to shew him the unreasonableness of his discontent.

JONAS (Justinus), a Protestant divine, born at North Haufen, in Thuringia, in 1493. He was one of Luther's most zealous disciples. He contracted a strict friendship with Melancthon; became principal of the

college of Wittenburg, and afterwards dean of the university of that city. He wrote a treatise in favour of the marriage of priests, and other works; and died in 1555.

JONAS (Arnagrinus), a learned Icelsander, acquired great reputation by his skill in the sciences, and particularly in astronomy. He was coadjutor to Guudebran de Thorlac, bishop of Hols, in Iceland. He refused that bishopric, after the death of Guudebran; and died in 1649. He wrote several works; the principal of which are, *Idea vera Magistratus*, and his history and description of Iceland.

JONATHAN, the son of Saul, celebrated in Sacred history for his valour, and his friendship for David against the interest of his own house. Slain in battle, 1055 B. C.

JONATHAN Maccabæus, brother of Judas, a renowned general of the Jews. He forced Bacchides the Syrian general, who made war with the Jews, to accept a peace; conquered Demetrius Soter, and afterwards Apollonius, that prince's general; but, being ensnared by Tryphon, was put to death, 144 B. C.

JONES (Inigo), a celebrated English architect, was the son of a cloth-worker of London, and was born in 1572. He was at first put apprentice to a joiner; but early distinguished himself by his inclination to drawing or designing, and was particularly taken notice of for his skill in landscape-painting. This afterwards recommended him to the favour of William earl of Pembroke, who sent him abroad with a handsome allowance in order to perfect himself in that branch. He was no sooner at Rome, than he found himself in his proper sphere: he felt that nature had not formed him to decorate cabinets, but to design palaces. He dropt the pencil, and conceived Whitehall. In the state of Venice he saw the works of Palladio, and learned how beautiful taste may be exerted on a less theatre than the capital of an empire. How his abilities distinguished themselves in a spot where they certainly had no opportunity to act, we are not told, though it would not be the least curious part of his history; certain it is, that, on the strength of his reputation at Venice, Christian IV. invited him to Denmark, and appointed him his architect; but on what buildings he was employed in that country, we are yet to learn. James I. found him at Copenhagen, and queen Anne took him in the quality of her architect to Scotland. He served prince Henry in the same capacity, and the place of surveyor-general of the works was granted to him in reversion. On the death of that prince, with whom at least all his lamented qualities did not die, Jones travelled once more into Italy, and, assisted by ripeness of judgment, perfected his taste. To the interval between these voyages Mr Walpole is inclined to assign those buildings of Inigo, which are less pure, and border too much upon the bastard style, which one may call *king James's gothic*. Inigo's designs of that period are not gothic; but have a littleness of parts, and a weight of ornaments, with which the revival of the Grecian taste was encumbered, and which he shook off in his grander designs. The surveyor's place fell, and he returned to England; and, as if architecture was not all he had learned at Rome, with an air of Roman disinterestedness he gave up the profits of his office,

which he found extremely in debt; and prevailed upon the comptroller and paymaster to imitate his example, till the whole arrears were cleared.

In 1620, he was employed in a manner very unworthy of his genius: king James set him upon discovering, that is, guessing, who were the founders of Stouchege. His ideas were all Romanized; consequently, his partiality to his favourite people, which ought rather to have prevented him from charging them with that mass of barbarous clumsiness, made him conclude it a Roman temple.

In the same year Jones was appointed one of the commissioners for the repair of St Paul's; but which was not commenced till the year 1633, when Laud, then bishop of London, laid the first stone, and Inigo the fourth. In the restoration of that cathedral, he made two capital faults. He first renewed the sides with very bad Gothic; and then added a Roman portico, magnificent and beautiful indeed, but which had no affinity with the ancient parts that remained, and made his own Gothic appear ten times heavier. He committed the same error at Winchester, thrusting a screen in the Roman or Grecian taste into the middle of that cathedral. Jones indeed was by no means successful when he attempted Gothic. The chapel of Lincoln's-Inn has none of the characteristics of that architecture. The cloyster beneath seems oppressed by the weight of the building above.

The authors of the life of Jones place the erecting of the Banqueting-house in the reign of king Charles; but it appears, from the accounts of Nicholas Stone, that it was begun in 1619, and finished in two years—a small part of the pile designed for the place of our kings; but so complete in itself, that it stands a model of the most pure and beautiful taste. Several plates of the intended palace at Whitehall have been given; but Mr Walpole thinks, from no finished design. The four great fronts are evidently made up from general hints; nor could such a source of invention and taste as the mind of Inigo, ever produce so glorious a success. The whole fabric, however, was so glorious an idea, that one forgets for a moment (says Mr Walpole), in the regret for its not being executed, the confirmation of our liberties, obtained by a melancholy scene that passed before the windows of that very Banqueting-house.

In 1623 he was employed at Somerset-house, where a chapel was to be fitted up for the Infanta, the intended bride of the prince. The chapel is still in being. The front to the river, part only of what was designed, and the water-gate, were erected afterwards on the designs of Inigo, as was the gate at York-stairs.

On the accession of Charles, Jones was continued in his posts under both king and queen. His fee as surveyor, was eight shillings and four-pence a-day, with an allowance of 46l. a-year for house-rent, besides a clerk, and incidental expences. What greater rewards he had, are not upon record.

During the prosperous state of the king's affairs, the pleasures of the court were carried on with much taste and magnificence. Poetry, painting, music, and architecture, were all called in to make them rational amusements. Mr Walpole is of opinion, that the celebrated festivals of Louis XIV. were copied

from the shews exhibited at Whitehall, in his time the most polite court in Europe. Ben Johnson was the laureat; Inigo Jones the inventor of the decorations; Lanieri and Perabosco composed the symphonies; the king, the queen, and the young nobility, danced in the interludes. We have accounts of many of those entertainments, called *maquers*; they had been introduced by Anne of Denmark.

Lord Burlington had a folio of the designs for these solemnities, by Inigo's own hand, consisting of habits, masks, scenes, &c. The harmony of these masks was a little interrupted by a war that broke out between the composers, Inigo and Ben; in which, whoever was the aggressor, the turbulent temper of Johnson took care to be most in the wrong. Nothing exceeds the grossness of the language that he poured out, except the badness of the verses that were the vehicle. There he fully exerted all the brutal abuse which his contemporaries were willing to think wit, because they were afraid of it; and which only seems to shew the arrogance of the man, who presumed to satirize Jones and rival Shakspear.

The works of Inigo Jones are not scarce; Surgeon's-hall is one of his best works. One of the most admired is the Arcade of Covent-garden, and the Church: "Two structures, (says Mr Walpole), of which I want taste to see the beauties. In the arcade there is nothing remarkable; the pilasters are as arant and homely stripes as any plasterer would make. The barn-roof over the portico of the church strikes my eyes with as little idea of dignity or beauty, as it could do if it covered nothing but a barn. It must be owned, that the defect is not in the architect, but in the order. —Who ever saw a beautiful Tuscan building? Would the Romans have chosen that order for a temple?" The expence of building that church was 4500 l.

Ambresbury in Wiltshire was designed by Jones, but executed by his scholar Webb. Jones was one of the first that observed the same diminution of pilasters as in pillars. Lindsey-house in Lincoln's-Inn Fields, which he built, owes its chief grace to this singularity. In 1618 a special commission was issued to the lord chancellor, the earls of Worcester, Pembroke, Arundel, and others, to plant, and reduce to uniformity, Lincoln's-Inn Fields, as it shall be drawn by way of map, or ground-plot, by Inigo Jones, surveyor-general of the works. That square is laid out with a regard to so trifling a singularity, as to be of the exact dimensions of one of the pyramids: this would have been admired in those ages when the Keep at Kenilworth Castle was erected in the form of an horse-fetter, and the Escurial in the shape of St Laurence's gridiron.

Colehill in Berkshire, the seat of Sir Matthew Pleydell, built in 1650, and Cobham-hall in Kent, were Jones's. He was employed to rebuild Calle Ashby, and finished one front: but the civil war interrupted his progress there and at Stoke-park in Northamptonshire. Shaftsbury-house, now the London Lying-in hospital, on the east side of Aldersgate-street, is a beautiful front. The Grange, the seat of the lord chancellor Henley in Hampshire, is entirely of this matter. It is not a large house, but by far one of the best proofs of his taste. The hall, which opens to a small vestibule with a cupola, and the stair-
case

Jonian.
Jonk.

cafe adjoining, are beautiful models of the purest and most classic antiquity. The gate of Deaufort-garden at Chelsea, designed by Jones, was purchased by lord Burlington, and transported to Chiswick. He drew a plan for a palace at Newmarket; but not that wretched hovel that stands there at present. One of the most beautiful of his works is the Queen's house at Greenwich. The first idea of the hospital is said to have been taken by his scholar Webb, from his papers.

Inigo tasted early the misfortunes of his master. He was not only a favourite, but a Roman catholic: in 1646, he paid 545 l. for his delinquency and sequestration. Whether it was before or after this fine, it is uncertain, that he and Stone the mason buried their joint flock in Scotland-yard; but an order being published to encourage the informers of such concealments, and four persons being privy to the spot where the money was hid, it was taken up, and reburied in Lambeth-marsh.

Grief, misfortunes, and age, put an end to his life at Somerset-house, July 21. 1651.

Several of his designs have been published by Mr Kent, Mr Colin Campbell, and Mr Isaac Ware. He left in MS. some curious notes on Palladio's architecture, which are inserted in an edition of Palladio published in 1714.

IONIA (anc. geog.), a district of the Hither Asia, a great colony of Greeks, led thither after that of Æolia. It consisted of twelve cities, ten of which were on the continent, and two on the islands of Samos and Chios; extending from Phocæa to Miletus, inclusive from north to south, according to Herodotus, Strabo, and Mela: Though Ptolemy confines it between the Hermus to the north, and the Meander to the south. *Jones* or *Jaones* the people, (Homer) taking name from *Javan* their progenitor: A soft and luxurious nation. Plato banishes from his republic the Ionian music, as too effeminate. The *Attagen Ionicus*, (Horace, Martial), was a bird in esteem for its flavour with persons who loved good eating.—The *Ionian* sea was that part of the Mediterranean extending between Epirus and Peloponnesus to the east, and Magna Græcia and part of Sicily to the west.

IONIC ORDER. See ARCHITECTURE, p. 352.

Ionian *Dialect*, in grammar, a manner of speaking peculiar to the people of Ionia.

IONIC SECT was the first of the ancient sects of philosophers; the others were the Italic and Eleatic. The founder of this sect was Thales, who, being a native of Miletus in Ionia, occasioned his followers to assume the appellation of *Ionian*: Thales was succeeded by Anaximander, and he by Anaximenes, both of Miletus; Anaxagoras Clazomenius succeeded them, and removed his school from Asia to Athens, where Socrates was his scholar. It was the distinguishing tenet of this sect, that water was the principle of all natural things.

JONK, or JONQUE, in naval affairs, is a kind of small ship, very common in the East Indies. These vessels are about the bigness of our fly-boats; and differ in the form of their building, according to the different methods of naval architecture used by the nations to which they belong. Their sails are frequently made of mats, and their anchors are made of wood.

JONSTON (John), a learned Polish naturalist and physician, born in 1603. He travelled all over Europe, and procured esteem every-where by his knowledge; afterward he bought the estate of Ziebendorf in the duchy of Lignitz in Silesia, where he spent the remainder of his days. He wrote a natural history of birds, fish, quadrupeds, insects, serpents, and dragons, in folio; a piece upon the Hebrew and Greek festivals, a thaumatography, and some poems. He died in 1675.

JOPPE (anc. geogr.), a town of Samaria, on the Mediterranean, situate in a plain (1 Macc. x.), in the tribe of Ephraim (Josh. xvi.). Here Andromeda is fabled to have been bound and exposed to the sea-monster, and delivered by Perseus. Now *Jaffa*, a port-town of Palestine. E. Long. 36. o. N. Lat. 32. 20.

JORDANO (Luca), an eminent Italian painter, was born at Naples in 1632. He became very early a disciple of Joseph Ribera; but going afterwards to Rome, he attached himself to the manner of Pietro da Cortona, whom he assisted in his great works. Some of his pictures being seen by Charles II. king of Spain, he engaged him in painting the Escorial; in which task he acquitted himself as a great painter. The king shewed him a picture of Bassani, expressing his concern that he had not a companion: Luca painted one so exactly in Bassani's manner, that it was taken for a performance of that master; and for this service he was knighted, and gratified with several honourable and valuable employments. The great works he executed in Spain, gave him still greater reputation when he returned to Naples; so that though he was a very quick workman, he could not supply the eager demands of the citizens. No one, not even Tintoret, ever painted so much as Jordano; and his generosity carried him so far as to present altar-pieces to churches that were not able to purchase them. His labours were rewarded with great riches; which he left to his family, when he died, in 1705.

JORDANS (James), one of the most eminent painters of the Flemish school, was born at Antwerp in 1593. He learned the principles of his art from Adam Van Ort, whose daughter he married; which connexion hindered him from gratifying his inclination of visiting Italy. He improved most under Rubens; for whom he worked, and from whom he drew his best principles: his taste directed him to large pieces; and his manner was strong, true, and sweet. A great number of altar-pieces painted by him are preserved in the churches in the Netherlands, which maintain the reputation of this artist. He died in 1678.

JORTIN (John), a very learned and ingenious English clergyman, was born in Huntingdonshire, about the year 1701. Having some private fortune of his own, and being of a peculiar disposition that could not solicit promotion, he remained long without preferment. In 1738, lord Winchelsea gave him the living of Eastwell in Kent; but the place not agreeing with his health, he soon resigned it. Archbishop Herring, who had a great value for him, about the year 1751 presented him to the living of St Dunstan's in the East; and bishop Obedilston in 1762 gave him that of Kensington, with a prebend in St Paul's cathedral, and made him archdeacon of London. His temper,

Johnston
Jortin.

Joseph
||
Jotapata.

temper, as well as his aspect, was rather morose and saturnine; but in company that he liked, he was at all times facetious, yet still with a mixture of *sal censura superiorum*. His sermons were sensible and argumentative; and would have made more impression on his hearers, had he been more attentive to the advantages flowing from a good delivery: but he appeared to greater advantage as a writer. His remarks on ecclesiastical history, his fix dissertations, his life of Erasmus, and his sermons, were extremely well received by the public. He died in the year 1770.

JOSEPH, the son of Jacob; memorable for his chastity, and the honours conferred on him at the court of Egypt, &c. He died in 1635 B. C. aged 110.

JOSEPHUS, the celebrated historian of the Jews, was of noble birth, by his father Mattathias descended from the high-priests; and by his mother of the blood-royal of the Maccabees; he was born A. D. 37, under Caligula, and lived under Domitian. At 16 years of age he betook himself to the sect of the Essenes, and then to the Pharisees; and having been successful in a journey to Rome, upon his return to Judaea he was made captain-general of the Galileans. Being taken prisoner by Vespasian, he foretold his coming to the empire, and his own deliverance by his means. He accompanied Titus at the siege of Jerusalem, and writ his "Wars of the Jews," which Titus ordered to be put in the public library. He afterwards lived at Rome, where he enjoyed the privileges of a Roman citizen, and where the emperors loaded him with favours, and granted him large pensions. Besides the above work, he wrote, 1. Twenty books of Jewish antiquities, which he finished under Domitian. 2. Two books against Appian. 3. An elegant discourse on the martyrdom of the Maccabees. 4. His own life. These works are excellently written in Greek.

JOSHUA, the renowned general of the Jews, who conducted them through the wilderness, &c. died in 1424 B. C. aged 110.

JOSHUA, a canonical book of the Old Testament, containing a history of the wars and transactions of the person whose name it bears. This book may be divided into three parts: the first of which is a history of the conquest of the land of Canaan; the second, which begins at the 12th chapter, is a description of that country, and the division of it among the tribes; and the third, comprised in the two last chapters, contains the renewal of the covenant he caused the Israelites to make, and the death of their victorious leader and governor. The whole comprehends a term of 17, or, according to others, of 27 years.

JOSIAH, king of Judah; the destroyer of idolatry, and the restorer of the true worship, an excellent magistrate, and a valiant general, was slain in battle, 609 B. C.

JOTAPATA (anc. geogr.), a town of the Lower Galilee, distant 40 stadia from Gabara: a very strong place, situate on a rock, walled round, and encompassed on all hands with mountains, so as not to be seen but by those who came very near. It was with great difficulty taken by Vespasian, being defended by Josephus, who commanded in it; when taken, it was ordered to be razed.

JOUBERT (Lawrence), counsellor and physician

Joubert
||
Journal.

to the king of France, chancellor and judge of the university of Montpellier, was born at Valence in Dauphiny in 1530. He became the disciple of Rondelet at Montpellier; and at his death succeeded to the regius professorship of that university, where he had given abundant proofs of his merit, and strengthened his reputation by the lectures he read in that capacity, as well as by the works he published. Henry III. who passionately wished to have children, sent for him to Paris, in hopes by his assistance to render his marriage fruitful; but he was disappointed, without any loss of repute to Joubert. Much offence was indeed taken at a piece he published under the title of *Vulgar errors*, in which he treated of virginity and generation more plainly than had ever before been done in the French language. But, though he had promised something more on the same subject, he was so piqued at the clamour raised against it, that the public saw no more, of six parts promised, than the first, and part of the second, though they were greatly called for. He died in 1582; and his son Isaac translated some of his Latin paradoxes into French.

JOVIAN, the Roman emperor, elected by the army, after the death of Julian the apostate, in 363. He at first refused, saying he would not command idolatrous soldiers; but, upon an assurance that they would embrace Christianity, he accepted the throne, and immediately shut all the Pagan temples, and forbid their sacrifices. But he did not long enjoy the dignity to which his merit had raised him; being suffocated in his bed by the fumes of a fire that had been made to dry the chamber, in 364, the 33d of his age, and the eighth month of his reign. See CONSTANTINOPLE, n° 71-73.

JOVIUS (Paul), in Italian *Giovio*, a celebrated historian, was born at Como in Italy, in the year 1483. As his father died in his infancy, he was educated by his eldest brother Benedict Jovius, under whom he became well skilled in classical learning; and then went to Rome, for the sake of enjoying the benefit of the Vatican library. He there wrote his first piece, *De piscibus Romanis*, which he dedicated to cardinal Lewis of Bourbon. He received a pension of 500 crowns for many years from Francis I. king of France, whose favour he secured by his flatteries. But, in the following reign, having disgusted the confiable Montmorency, his name was struck out of the list of pensioners. Jovius did not suffer his spirits to sink under this misfortune: he had obtained a high reputation in the learned world by his writings; and having always shewed great respect to the house of Medicis, on whose praises he had expatiated in his works, he applied to Clement VII. and obtained the bishoprick of Nocera. His principal piece is his history, which is that of his own time throughout the world, beginning with 1494, and extending to the year 1544. This was the chief business of his life. For he formed the plan of it in the year 1515; and continued upon it till his death, which happened at Florence in 1552. It is printed in three volumes folio. He is allowed to have been a man of wit as well as learning; he was master of a bright and polished style, and has many curious observations: but being a venal writer, his histories are not much credited.

JOURNAL, or DAY-BOOK. See BOOK-KEEPING.

JOUR-

JOURNAL, in navigation, a sort of diary, or daily register of the ship's course, winds, and weather; together with a general account of whatever is material to be remarked in the period of a sea-voyage.

In all sea-journals, the day, or what is called the *24 hours*, terminates at noon, because the errors of the dead-reckoning are at that period generally corrected by a solar observation. The daily compact usually contains the state of the weather; the variation, increase, or diminution of the wind; and the suitable shifting, reducing, or enlarging the quantity of sail extended; as also the most material incidents of the voyage, and the condition of the ship and her crew; together with the discovery of other ships or fleets, land, shoals, breakers, soundings, &c. *

See Na-
tion.

JOURNAL, is also a name common for weekly essays, news-papers, &c. as the Grays-Inn journal, the Westminster journal, &c.

JOURNAL, is also used for the titles of several books which come out at stated times, and give abstracts, accounts, &c. of the new books that are published, and the new improvements daily made in arts and sciences; as the *Journal de Savans*, &c.

JOURNEY, a tract of ground passed over in travelling by land; properly as much as may be passed over in one day.

Management of a Horse on a Journey. See **HORSE**.

JOURNEYMAN, properly one who works by the day only; but the word is now used for any one who works under a master, either by the day, the year, or the piece.

JOUVENET (John), a celebrated French painter, was born at Rouen in 1644; where his father, who was a painter, bred him up to the same profession: but his greatest improvement was confessedly derived from the instructions of Nicholas Poussin, and studying the works of that master. He acquired so good a knowledge of design, as qualified him for employment in several grand works in the palaces at Paris and Trianon; in many of the churches and convents; and in the hospital of invalids, where he painted the twelve apostles, each figure being 14 feet high. He was esteemed to have a ready invention, to be correct in his designs, and to have a taste for grandeur in his compositions: it is observed of this artist, that being deprived of the use of his right hand by a paralytic disorder, he nevertheless continued to paint with his left. He died in the year 1717.

JOY, that affection of the mind consequent on being put in possession of what we have desired. For the effects of joy in the animal œconomy, see (the *Index* subjoined to) **MEDICINE**.

IPEACUANHA, in the materia medica, a West-Indian root, of which there are two kinds, distinguished by their colour, and brought from different places; but both possessing the same virtues, tho' in a different degree. The one is grey, and brought from Peru; the other is brown, and is brought from the Brasils; and these are indiscriminately sent into Europe under the general name of *ipeacuanha*.

These two sorts have been by some supposed to be the roots of two different plants: but this is a mistake; the only difference is, that one grows in a different place, and in a richer and moister soil, and is better

supplied with juices than the other.

Ipeacuanha is an excellent, mild, and safe emetic; it is also a noble restringent; and, given in doses too small to vomit, is the greatest of all remedies for a dysentery. Small doses are also an excellent remedy in diarrhoeas of a more simple kind; and in the fluxus albus we hardly know a better medicine.

IPICRATES, general of the Athenians, had that command conferred upon him at 20 years of age, and became famous for the exactness of his military discipline. He made war on the Thracians; restored Scythia, who was an ally of the Athenians; attacked the Lacedæmonians; and, on many other occasions, gave signal proofs of his conduct and courage. Many ingenious repartees have been mentioned of this general: a man of good family with no other merit than his nobility, reproaching him one day for the meanness of his birth, he replied, "I shall be the first of my race, and thou the last of thine." He died 380 B. C.

IPOMEA, *QUAMOILIT*, or *Scarlet Convolvulus*; a genus of the monogynia order, belonging to the pentandria class of plants. There are several species; but not more than one, (the coccinea), cultivated in our gardens. This hath long, slender, twining stalks, rising upon support six or seven feet high. The leaves are heart-shaped, pointed, and angulated at the base, and from the sides of the stalks and branches arise many slender footstalks; each supporting several large and beautiful funnel-shaped and scarlet flowers. There is a variety with orange-coloured flowers. Both of them are annual, rising from seed in spring, flowering in July and August, ripening their seeds in September and October, and totally perishing in a short time after. They are tender, and must be brought up in a hot-bed till the latter end of May or beginning of June, when they may be planted out to adorn the borders, or some may be planted in pots to move occasionally to adorn any particular place; but in either case, there must be sticks for them to twine upon.

IPSWICH, the capital of the county of Suffolk in England, seated in E. Long. 1. 6. N. Lat. 52. 12. The name comes from the Saxon *Gyfeþwick*, that is, a town situated upon the Gyppen, now called *Orwell*. It had once 21 churches, but now has only 12. It was plundered by the Danes in 991, and afterwards besieged by king Stephen. It had charters and a mint in the reign of king John, but its last charter was from Charles II. The remains of a wall and six or seven religious houses are still to be seen. Though it is not in so flourishing a state as formerly when the harbour was more commodious, yet it is still a large well-built town. Besides the churches already mentioned, it has several meeting-houses, two chapels, a town-hall, council-chamber, a large market-place with a cross in the middle of it, a shire-hall for the county-sessions, a library, several hospitals, a free-school, a handsome stone bridge over the river, stately shambles in the market-place built by cardinal Wolsey, who was a native of the town and a butcher's son, and who also began to build a college here on the ruins of a small college of black canons, which still bears his name, though it was never finished. Here are also several alms-houses, three charity-schools, and a convenient key and custom-house. By virtue of Charles II.'s charter,

Ipſwich,
Ireland.

charter, the town is governed by two bailiffs, a recorder, 12 portmen, of whom the bailiffs are two, a town-clerk, two coroners, and 24 common-council. The bailiffs and 24 of the portmen are justices of the peace. The town enjoys a great many privileges, as paſſing fines and recoveries, trying criminal, and even crown and capital cauſes among themſelves, ſettling the aſſize of bread, wine, and beer. No freeman is obliged to ſerve on juries out of the town, or bear any office for the king, except that of the ſheriff, or to pay tolls or duties in any other part of the kingdom. They have an admiralty juriſdiction beyond Harwich on the Eſſex coaſt, and on both ſides the Suffolk coaſt, by which they are intitled to all goods caſt on ſhore. The bailiffs even hold an admiralty-court beyond Landguard fort. By a trial in king Edward III.'s time, it appears that the town had a right to the cuſtom-duties for all goods coming into Harwich-haven. They claim a right alſo to all waives and ſtrays, &c. The manufactures of the town are chiefly woollen and linen cloth. It has ſtill a conſiderable foreign trade. The tide riſes pretty high, and brings great ſhips within a ſmall diſtance of the town. They export a great deal of corn to London, and ſometimes to Holland. Formerly, they had a great trade in ſhip-building; but that having declined, they now ſend great quantities of timber to the king's yard at Chatham. It has ſeveral great fair for cattle, cheeſe, and butter; and is admirably ſituated for the trade to Greenland, becauſe the ſame wind that carries them out of the river will carry them to Greenland. It is worth remarking, that it is one of the beſt places in England for perſons in narrow circumſtances, houſe-rent being eaſy, provisions cheap and plentiful, the paſſage by land or water to London, &c. convenient, and the company of the place good. It gives title of viſcount, as well as Thetford, to the duke of Grafton.

IRELAND, one of the Britanniſh iſlands, ſituated between the 5th and 10th degrees of weſt longitude, and between the 51ſt and 56th of north latitude, extending in length about 300 miles, and about 150 in breadth.

The ancient hiſtory of this iſland is involved in ſo much obſcurity, that it has been the object of contention among the antiquarians for upwards of a century and an half. The Irifh hiſtorians pretend to very great antiquity. According to them, the iſland was firſt inhabited about 322 years after the flood. At that time Partholanus the ſon of Scara landed in Munſter on the 14th of May with 1000 ſoldiers, and ſome women, from Greece. This voyage he had undertaken on account of his having killed his father and mother in his native country. The ſame hiſtorians inform us, that a great number of lakes broke out in Ireland during the reign of Partholanus, which had no exiſtence when he came into the iſland, with many other particulars not worth mentioning; but the moſt ſurpriſing circumſtance is, that about 300 years after the arrival of this Grecian colony, all of them periſhed by a plague, not a ſingle perſon remaining to tell the fate of the reſt; in which caſe, it is wonderful how the catastrophe ſhould have been known.

After the extinction of this firſt colony, Ireland remained a perfect wilderneſs for 30 years; when ſno-

ther colony arrived from the eaſt, under the direction of one Nemedius. He ſet fail from the Euxine ſea with 30 tranſports, each manned with 40 heroes; and at laſt arrived on the coaſts of Ireland, after a very tedious and ſtrange navigation. During his reign alſo many lakes were formed in the country, which had no exiſtence before; the moſt material circumſtance, however, was an unſucceſſful war in which he was engaged with ſome African pirates, who in the end enſlaved his people. The victors proved ſuch inſupportable tyrants, that the Irifh found themſelves under a neceſſity of quitting the iſland altogether. They embarked on board a fleet of 1130 ſhips, under the command of three grandſons of Nemedius, viz. Simon Breac, To Chath, and Briatan Maol. The firſt returned to Greece, the ſecond failed to the northern parts of Europe, and the third landed in the north of Scotland, and from him the iſland of Britain is ſaid to have taken its name, and the Welch their origin.

About 216 years after the death of Nemedius, the descendants of Simon Breac returned from Greece into Ireland. They were conducted by five princes of great reputation, who divided the iſland into five kingdoms, nearly equal in ſize. Theſe kingdoms were called *Munſter, Leinſter, Connaught, Meath, and Ulſter*; and the ſubjects of theſe kings are called by the Irifh hiſtorians, *Firbolgs*.

The Firbolgs were in proceſs of time expelled or totally ſubdued, after the loſs of 100,000 men in one battle, by the *Tuath de Dannans*, a nation of necromancers who came from Attica, Bæotia, and Achaia, into Denmark; from Denmark to Scotland; and from Scotland to Ireland. Theſe necromancers were ſo completely ſkilled in their art, that they could even reſtore the dead to life, and bring again into the field thoſe warriors who had been ſlain the day before. They had alſo ſome curioſities which poſſeſſed a wonderful virtue. Theſe were a ſword, a ſpear, a cauldron, and a marble chair; on which laſt were crowned firſt the kings of Ireland, and afterwards thoſe of Scotland. But neither the powerful virtues of theſe Daniſh curioſities, nor the more powerful ſpells of the magic art, were able to preſerve the *Tuath de Dannans* from being ſubdued by the Gadelians when they invaded Ireland.

The Gadelians were defended from one Gathelus, from whom they derived their name. He was a man of great conſequence in Egypt, and intimately acquainted with Moſes the Jewiſh legiſlator. His mother was ſcota, the daughter of Pharaoh, by Nihil the ſon of a Scythian monarch cotemporary with Nimrod. The Gadelians, called alſo *Scots*, from ſcota above-mentioned, conquered Ireland about 1300 B. C. under Heber and Heremon, two ſons of Mileſius king of Spain, from whom were defended all the kings of Ireland down to the Engliſh conqueſt, and who are therefore ſtyled by the Irifh hiſtorians, princes of the *Mileſian race*.

From this period the Irifh hiſtorians trace a gradual refinement of their countrymen from a ſtate of the groſſeſt barbarity, until a monarch, named *Ollam Fodla*, eſtabliſhed a regular form of government, erected a grand ſeminary of learning, and inſtituted the *Fer*, or triennial convention of provincial kings, prieſts, and poets, at Feamora or Tara in Meath, for the eſta-
ment

I
Origin of
the Irifh,
according to
their own
hiſtorians.

Ireland.

ment of laws and regulation of government. But whatever were the institutions of this monarchy, it is acknowledged that they proved insufficient to withstand the wildness and disorder of the times. To Kimbath, one of his successors, the annalists give the honour of reviving them, besides that of regulating Ulster, his family-province, and adorning it with a stately palace at Eamannia near Armagh. His immediate successor, called *Hugony*, is still more celebrated for advancing the work of reformation. It seems, that, from the earliest origin of the Irish nation, the island had been divided into the five provincial kingdoms above-mentioned, and four of these had been subject to the fifth, who was nominal monarch of the whole island. These four, however, proved such obnoxious disturbers of the peace, that Hugony, to break their power, parcelled out the country into 25 dynasties, binding them by oath to accept no other monarch but one of his own family. This precaution proved ineffectual. Hugony himself died a violent death, and all his successors for a series of ages were assassinated, scarcely with one exception.

About 100 B. C. the pentarchal government was restored, and is said to have been succeeded by a considerable revolution in politics. The Irish bards had for many ages dispensed the laws, and the whole nation submitted to their decisions; but as their laws were exceedingly obscure, and could be interpreted only by themselves, they took occasion from thence to oppress the people, until at last they were in danger of being totally exterminated by a general insurrection. In this emergency they fled to Convochar-Mac-Nessa, the reigning monarch, who promised them his protection in case they reformed; but at the same time, in order to quiet the just complaints of his people, he employed the most eminent among them to compile an intelligible, equitable, and distinct, body of laws, which were received with the greatest joy, and dignified with the name of *celestial decisions*. These decisions seem to have produced but very little reformation among the people in general. We are now presented with a new series of barbarities, murders, factions, and anarchy; and in this disordered situation of affairs it was, according to the Irish historians, that the chieftain mentioned by Tacitus addressed himself to Agricola, and encouraged him to make a descent on Ireland. This scheme happened not to suit the views of the Roman general at that time, and therefore was not adopted; and so confident are these historians of the strength of their country even in its then distracted state, that they treat the notion of its being subdued by a Roman legion and some auxiliaries (the force proposed to Agricola), as utterly extravagant; acquainting us at the same time, that the Irish were so far from dreading a Roman invasion, that they failed to the assistance of the Picts, and having made a successful incursion into South Britain, returned home with a considerable booty.

In the same state of barbarity and confusion the kingdom of Ireland continued till the introduction of Christianity by St Patrick, about the middle of the fifth century. This missionary, according to the adversaries of the Irish antiquity, first introduced letters into Ireland, and thus laid the foundations of a future civilization. On the other hand, the advocates for that

antiquity maintain, that the Irish had the knowledge of letters, and had made considerable progress in the arts, before the time of St Patrick; tho' they allow, that he introduced the Roman character, in which his copies of the Scripture and liturgies were written. To enter into this dispute would be contrary to our plan. It is sufficient to observe, that, excepting by some of the Irish themselves, the history already given is generally reckoned entirely fabulous, and thought to have been invented after the introduction of Christianity. An origin of the Irish nation hath been found out much nearer than Asia, Greece, or Egypt; namely, the island of Britain, from whence it is now thought that Ireland was first peopled. A dispute hath arisen concerning the place from whence the first emigrants from Britain set sail for Ireland. The honour of being the mother-country of the Irish hath been disputed between the North and South Britons. Mr Macpherson has argued strenuously for the former, and Mr Whitaker for the latter. For an account of their dispute, however, we must refer to the works of these gentlemen. Mr Whitaker claims the victory, and challenges to himself the honour of being the first who clearly and truly demonstrated the origin of the Irish.

The name of Ireland, according to Mr Whitaker, is obviously derived from the word *Jar*, or *Eir*, which in the Celtic language signifies "well." This word was sometimes pronounced *Iver*, and *Hiver*; whence the names of *Iris*, *Ierna*, *Juerna*, *Iverna*, *Hibernia*, and *Ireland*; by all of which it hath at some time or other been known.

About 350 B. C. according to the same author, the Belgæ crossed the channel, invaded Britain, and seized the whole extended line of the southern coast, from Kent to Devonshire. Numbers of the former inhabitants, who had gradually retired before the enemy, were obliged at last to take shipping on the western coast of England, and passed over into the uninhabited isle of Ireland. These were afterwards joined by another body of Britons driven out by the Belgæ under Divitiacus, about 100 B. C. For two centuries and a half afterwards, these colonies were continually reinforced with fresh swarms from Britain; as the populousness of this island, and the vicinity of that invited them to settle in the one, or the bloody and successive wars in Britain during this period naturally induced them to relinquish the other: and the whole circuit of Ireland appears to have been completely peopled about 150 years after Christ; and as the inhabitants had all fled equally from the dominion of the Belgæ, or for some other cause left their native country, they were distinguished among the Britons by one general and very apposite name, viz. that of *Scuitæ*, or *Scots*, "the wanderers, or refugees."

Mr Whitaker also informs us, "that in the times of the Romans Ireland was inhabited by 18 tribes; of one upon the northern and three on the southern shore; seven upon the western, six on the eastern, and one in the centre.

"Along the eastern coast, and the Vergivian or internal ocean, were ranged the Damnii, the Voluntii, and the Eblani, the Cascii, the Menapii, and the Coriandii. The first inhabited a part of the two counties of Antrim and Down, extending from Fair-head, the most north-easterly extremity of the island, to Slannum

Early history of Ireland by Mr Whitaker.

Names and situation of the tribes by which it was inhabited.

" Upon the southern shore and along the verge of the Cantabrian ocean, lay the Brigantes, the Vodiae, and the Ibernii. The first owned the rest of Wexford and all Waterford: extending to the Blackwater, Aven-More, or Dabrona, on the south-west; having the great mouth of the Barrow within their territories, and Brigantia, Waterford, or some town near it, for their first city; and giving name of *Brigas* to the Suir or Swire, their liminary stream on the north, and the appellation of *Bergie* to their own part of the county of Wexford. The Vodiae possessed the shire of Corke from the Blackwater to the Ban, the river of Kinsale, and the Dobona or Dubana of the ancients; and affixed the name of *Vodium Promontorium* to the point of Balcotton island. And the Ibernii inhabited the remainder of Corke, and all that part of Kerry which lies to the south-east of Dingle-found; having Rufina or Ibaune for their capital, the Promontorium Austrinum or Misen-Head about the middle of their dominions, and the river Ibernus or Dingle-found for their northern barrier; and leaving their names to the three divisions of Ibaune, Beare, and Iveragh.

" Upon the western shore of the island and along the Great Britannie or Atlantic ocean, were the Lucanii or Lucenii, the Velaborii, the Cangani, the Auterii, the Nagnatae, the Hardinii, and Venicnii. The Lucenii inhabited the peninsula of land that lies along the river Ibernus or Dingle-found, and perhaps some adjoining parts of Kerry. The Velaborii ranged along the small remainder of the latter, and over the whole of Limerick to the Senus or Shannon; having the Durus or Casheen flowing through their dominions, and Regia, Limeric, or some town near it, for their metropolis. And the latter was probably that city near Limerick, the site of which is still famous, and retains the appellation of *Cathair*, or the fortrefs; and where

the remains of streets, and other marks of a town, may yet be traced. The Cangani lived in the county of Clare: Macolicum near the Shannon, perhaps Feakle or Melic, being their principal town; a headland in the Bay of Galway, near Glaniny, being denominated *Benifannum Promontorium*; and the adjoining isles of Arran, called *Insula Cangane*. The Auterii were settled in the county of Galway; winding along the deep reefs of the Sinus Auloba or Bay of Galway; stretching towards the north as far the Libnius, or the river that bounds the shire in that part; and possessing the small portion of Mayo, which lies to the south of it. And these were subject to Auterium, anciently Aterith, and now Athenree; and have left their name to the division of Athenree. The Nagnatae occupied the rest of the large county of Mayo, all Sligo and all Roscommon, all Letrim as far as Lough Allin on the south-east, and all Fermanagh to Ballyshannon and Lough Erne; being bounded by the Rhebius or river of Ballyshannon, and the Lake Rhebius or Lough Erne; having a deep bay, called *Magnus Sinus*, that curves along Mayo, Sligo, and Letrim counties; and acknowledging Nagnat, Necmaht, or Alnecmaht, the town of the Nagnatae, for their capital. And the Hardinii and Venicnii were confederated together under the title of the *Venicnian Nations*, extended from Ballyshannon to the North-Cape, and possessed all Donnegalle, except the two whole divisions of Raphoe and Enis-Owen, and the eastern part of Killmacrenn. The Venicni lay along the immediate margin of the shore, giving name to the Promontorium Venicnium or Cape Horn, and to the Insula Venicnia or North-Arran Island. And their metropolis Rheba was seated upon the lake Rhebius, and in the country of the Hardinii on the south-east.

" Upon the northern shore and along the margin of the Deucalædonian ocean, were only the Robogdii; inhabiting the rest of Donnegalle, all Derry, and all Antrim to the Fair-Head, and the Damni; and giving their own name to the former and the division of Raphoe. And they had the rivers Vidua or Shipharbour, Argita or Lough Swilly, Darabouna or Lough Foile, and Banna or Ban, in their territories; and acknowledged Robogdium, Robogh, or Raphoe, for their chief city.

" The central regions of the island, all Tyrone, the remainder of Fermanagh and Letrim, all Monaghan, and the rest of Ardmagh; all Cavan, all Longford, and all West-Meath; all the King's and Queen's county, all Kilkenny, and all Tipperary; were planted by the Scoti. The Shannon, Lough Allin, and Lough Erne, were their great boundaries on the west; the Barrow, Boyne, and Lough Neagh, on the east; the Swire and Blackwater on the south; and a chain of mountains on the north. And the two greatest of their towns were Rheba, a city seated, like the Rheba of the Venicnians, upon the lake and river Rhebius, but on a different part of them, and somewhere in the north of Cavan; and Ibernia, a town placed a little to the east of the Shannon, and somewhere in the county of Tipperary."

But whether we are to receive as truth the accounts given by Mr Whitaker, those of the Irish annalists, or any other, it is certain, that, till little more than a century ago, Ireland was a scene of confusion and

saughter

Ireland.

slaughter. The Irish historians acknowledge this, as we have already seen. Very few of their monarchs escaped a violent death. The histories of their kings indeed amount to no more than this, viz. that they began to reign in such a year, reigned a certain number of years, and were slain in battle by the valiant prince who succeeded to the throne. The introduction of Christianity seems to have mended the matter very little, or rather not at all. The same wars between the chiefs continued; and the same murders and treacheries took place among the inhabitants, till they were invaded by the Danes or Normans, about the end of the eighth century. At this time, we are told, that the monarchical power was weak, by reason of the factious and assuming disposition of the inferior dynasties; but that the evils of the political constitution had considerably subsided by the respect paid to religion and learning. The first invasions of the Danes were made in small parties for the sake of plunder, and were repelled by the chieftain whose dominions were invaded. Other parties appeared in different parts of the island, and terrified the inhabitants by the havoc they committed. These were in like manner put to flight, but never failed to return in a short time; and in this manner was Ireland harried for the space of 20 years, before the inhabitants thought of putting an end to their intestine contests, and uniting against the common enemy. The northern pirates, either by force or treaty, gradually obtained some small settlements on the island; till at length Turges, or Turgeus, a warlike Norwegian, landed with a powerful armament in the year 815. He divided his fleet and army, in order to strike terror in different quarters. His followers plundered, burned, and massacred, without mercy, and persecuted the clergy in a dreadful manner on account of their religion. The Danes already settled in Ireland, flocked to the standard of Turgeus, who thus was enabled to seat himself in Armagh, from which he expelled the clergy, and seized their lands. The Irish, in the mean time, were infatuated by their private quarrels; till at last, after some ill-conducted and unsuccessful efforts, they sunk into a state of abject submission, and Turgeus was proclaimed monarch of the whole island, in 845.

The new king proved such a tyrant, that he soon became intolerable. A conspiracy was formed against him; and he was seized by Melachline prince of Meath, in a time of apparent peace. An universal insurrection ensued; the Danes were massacred or dispersed; their leader condemned to death for his cruelties, and drowned in a lake. The foreigners, however, were not exterminated, but the remains of them were allowed to continue on the island as subjects or tributaries to some particular chieftains. A new colony soon arrived, but under pretence of peaceable intentions, and a design of enriching the country by commerce. The Irish, through an insatiable policy, suffered them to become masters of Dublin, Limerick, Waterford, and other maritime places, which they enlarged and fortified with such works as had till then been unknown in Ireland. The Danes did not fail to make use of every opportunity of enlarging their territories, and new wars quickly ensued. The Irish were sometimes victorious, and sometimes not; but were never able to drive out their enemies, so that they continued

to be a very distinguished and powerful *sept*, or tribe, in Ireland. The wars with the Danes were no sooner at an end, than the natives, as usual, turned their arms against each other. The country was harassed by the competitions of the chiefs; laws and religion lost their influence, and the most horrid licentiousness and immorality prevailed. Thus the whole island seemed ready to become a prey to the first invader, when an attempt was made upon it by Magnus king of Norway. This attempt miscarried, through his own rashness; for, having landed without opposition, he advanced into the country without the least apprehension. The consequence of this was, that he was surrounded and cut in pieces with all his followers. His death, however, proved of little benefit to Ireland; the same disorders which had gradually reduced the kingdom to a state of extreme weakness, still continued to operate, and to facilitate the success of the English invasion, which happened in the reign of Henry II.

The first motives which induced this monarch to think of an expedition against Ireland are not well known. It was supposed that he had been provoked by some assistance which the Irish princes had given to the French; but, whatever might be in this, it is certain that the design was conceived soon after he ascended the throne; and his flatterers soon furnished him with sufficient reasons for considering the Irish as his subjects. It was affirmed, that they had originally possessed themselves of their country by permission of Gurguntius a British king; and that, as descendants of the Britons, they were the natural and rightful subjects of the English monarch. It was also suggested, that the renowned king Arthur, Egred the Northumbrian prince, and Edgar one of the Saxon kings of England, had all led their armies into Ireland, and there made valuable acquisitions, which their successor was in honour bound to recover and maintain. All these suggestions, however, or whatever else had occurred to himself, seemed yet insufficient to Henry; and therefore he took the most effectual method to ensure his reputation, namely, by an application to the pope. To him he represented, that the inhabitants of Ireland were sunk into the most wretched state of corruption, both with regard to morals and religion; that Henry, zealous for the honour and enlargement of God's kingdom, had conceived the pious design of erecting it in this unhappy country; was ready to devote himself and all his powers to this meritorious service; implored the benediction of the pontiff; and requested his permission and authority to enter Ireland, to reduce the disobedient and corrupt, to eradicate all sin and wickedness, to instruct the ignorant, and spread the blessed influence of the gospel in all its purity and perfection; promising at the same time to pay a yearly tribute to St Peter from the land thus to be reduced to his obedience, and to the holy see. Adrian, the reigning pope, rejoiced at this application which tended so much to the advancement of his own power. A bull was therefore immediately formed, conformable to the most sanguine wishes of Henry, which was sent to England without delay, together with a ring, the token of his investiture as rightful sovereign of Ireland. But whatever inclination the king of England or the pope might at this time (A. D. 1156) have

Ireland.

Henry II. of England meditates an invasion of Ireland.

Is invested with the sovereignty by the Pope.

Ireland.

7
State of
Ireland at
that time.

for the subjection of Ireland, the situation of the English affairs obliged him to defer it for some time.

The state of Ireland, as we have already observed, was at this time extremely favourable for an invasion. The monarch enjoyed little more than a titular dignity, being harassed by a faction, and opposed by powerful rivals. A number of chieftains who assumed the title and rights of royalty, paid a precarious tribute to their superior, and united, if they were disposed to unite, with him, rather as his allies than his subjects. In Ulster, the family of the northern *Hi Nial*, as it was called, exercised an hereditary jurisdiction over the counties now called *Tirone*, *Derry*, and *Donnegal*. They also claimed a right of supremacy over the lords of Fermanagh, Antrim, and Arglai, which included the counties of Armagh, Monaghan, Louth, and some adjacent districts: while Dunleve, prince of Uldagh (now Down), disputed the superiority of this family, and affected an independent state. In Munster, reigned the descendants of Brien, a famous sovereign of former times, impatient to recover the honours of their family; but at last, being confined by powerful rivals to the territory of North Munster, they were obliged to leave the family of Mac Arthy sovereigns of Desmond, the southern division. In Connaught, the princes known by the name of *O'Connor*, were acknowledged sovereigns of the eastern territory. Tiernan O'Ruarc, an active and restless military chief, had the supremacy in Breffney, containing the modern county of Leitrim, and some adjacent districts. Meath, or the southern *Hi-Nial*, was subject to the family of Clan-Colman, Murchard O'Malachlyn, and his successors. Leinster, divided into several principalities, was subject to Dermot, a fierce, haughty, and oppressive tyrant. His father had governed with great cruelty. Seventeen of his vassal lords had been either put to death, or had their eyes put out, by his order in one year; and Dermot seemed to inherit too great a portion of the same temper. His stature and bodily strength made him admired by the inferior orders of his subjects, and these he was careful to protect and favour. His donations and endowments of religious houses recommended him to the clergy; but his tributary chieftains felt the weight of his pride and tyranny, and to them his government was extremely odious.

The chief competitors for the rank of monarch of Ireland, in the mean time, were, the heirs of the two houses of O'Connor, and the northern *Hi-Nial*. Torlogh O'Connor was in possession; but he was not generally recognised, and was opposed by his rival O'Lochlan: notwithstanding which, he maintained his dignity with magnificence and vigour, till a decisive victory gained by him over O'Brien raised O'Lochlan's jealousy so much, that he obliged him, in a convention of the states, to allow him the sovereignty of the northern division. In consequence of this partition, it was resolved to transfer the territory of O'Ruarc to a person more inclined to the interests of the two sovereigns. An expedition was accordingly undertaken; O'Ruarc was surprised, defeated, and driven from his dominions. Dermot, who had conceived an unlawful passion for Dervorgah, the wife of O'Ruarc, took the opportunity of her husband's distresses, to carry her off in triumph. O'Ruarc conceived the most implacable re-

Ireland.

sentment against Dermot; and therefore applying himself to Torlogh, promised an inviolable attachment to his interest; and prevailed on him not only to re-instate him in his possessions, but to revenge the insult offered by Dermot, and to restore his wife. By means of such a powerful ally, O'Ruarc found frequent opportunities of harassing his antagonist till the death of Torlogh, which happened in 1156, upon which O'Lochlan succeeded to the sovereignty. Dermot was the first to acknowledge the authority of this new sovereign, by whose means he hoped to be able to revenge himself on O'Ruarc. He soon found, however, that he had acted too precipitately. His patron, having treacherously seized and put out the eyes of Dunleve prince of Down, the neighbouring chieftains took arms, in order to secure themselves from his barbarity. O'Lochlan was defeated and killed; upon which the monarchy devolved on Roderic the son of the late Torlogh O'Connor.

The new prince had acquired the reputation of valour, and was determined to establish this reputation by some remarkable exploit in the beginning of his reign. Having therefore engaged in his service the Ostmen, or descendants of the Danes, he marched against Dermot as the chief partizan of his fallen rival. The king of Leinster was seized with the utmost consternation; and in despair set fire to his own town of Ferns, lest the enemy should have the satisfaction of spoiling it. Roderic still advanced, attended by O'Ruarc, Dermot's implacable enemy, and soon over-ran the whole province. All the inferior lords at once acknowledged Roderic's authority. Dermot was deposed, as a man utterly unworthy of his station; another of his family was raised to the throne; and the unfortunate prince, finding it impossible to stay with safety in Ireland, embarked with 60 of his followers for England, and soon arrived at the port of Bristol, with a design to solicit assistance from king Henry.

8
Dermot,
an exiled
prince, so-
licits assis-
tance from
Henry II.

In England, Dermot's character was unknown, and he was regarded as an injured prince driven from his throne by an iniquitous confederacy. The clergy received him as the benefactor of their order, and entertained him in the monastery of Angustines with great hospitality. Having learned that Henry was then in Aquitaine, he immediately went thither, and in a very abject manner implored his assistance, promising to acknowledge him as his liege lord, and to hold his dominions, which he was thus confident of regaining, in vassalage to Henry and his heirs.

Though nothing could be more flattering to the ambition of the king of England than this servile address, yet the situation of his own affairs rendered it impossible for him at that time to reap from it any of the advantages with which it flattered him. He therefore dismissed the Irish prince with large presents, and a letter of credence addressed to all his subjects; notifying his grace and protection granted to the king of Leinster; and declaring, that whosoever within his dominions should be disposed to aid the unfortunate prince in the recovery of his kingdom, might be assured of his free licence and royal favour.

Dermot returned to England highly pleased with the reception he had met with; but notwithstanding the king's letter, none of the English seemed to be disposed to try their fortunes in Ireland. A month

Ireland.

Ireland.

9
Persuades
some ad-
venturers
to follow
him to Ire-
land.

elapsed without any prospect of success, so that Dermot began to despair. At last, however, he persuaded, with great promises, Richard Earl of Chepstow, or, as it was formerly called, *Strigul*; a nobleman of considerable influence in Wales, but of broken fortune, to assist him with a considerable force to be transported next spring into Ireland. Overjoyed at this first instance of success, he advanced into South Wales, where, by the influence of the bishop of St David's, he procured many other friends. Robert Fitz-Stephen, a brave and experienced officer, covenanted with him to engage in his service with all his followers, and Maurice Fitz-Gerald his maternal brother; while Dermot, on his part, promised to cede to the two principal leaders, Fitz-Stephen and Fitz-Gerald, the entire dominion of the town of Wexford, with a large adjoining territory, as soon as, by their assistance, he should be reinstated in his rights.

The Irish prince having now accomplished his purpose, set sail for Ireland in the winter of 1169, and recovered a small part of his dominions even before the arrival of his new allies; but being attacked with a superior force by his old enemies Roderic and O'Ruarc, he found himself obliged to feign submission till the English allies came to his assistance. The expected succours arrived in the month of May 1170, in a creek called the *Bann*, near the city of Wexford. Robert Fitz-Stephen commanded 30 knights, 60 men in armour, and 300 archers. With these came Harvey of Mountmorres, nephew to earl Richard. He had no military force along with him; but came solely with a view of discovering the nature of the country, and reporting it to his uncle. Maurice of Pendergast commanded 10 knights and 200 archers: and thus the English force which was to contend with the whole strength of Ireland, amounted to no more than 600 men.

10
Their suc-
cess.

Trusting as this assistance may seem, it nevertheless changed the face of affairs almost instantaneously. Numbers of Dermot's subjects, who had abandoned him in his distress, now flocked to his standard. Wexford was immediately attacked, and surrendered in a few days; Fitz-Stephen and Fitz-Gerald were jointly invested with the lordship of this city and its domain; and Harvey of Mountmorres was declared lord of two considerable districts on the coast. After three or four weeks spent in feasting and rejoicing, a new expedition was undertaken against the prince of Ossory, (a district of Leinster), who had not only revolted from Dermot, but put out the eyes of one of his sons, and that with such cruelty, that the unhappy youth expired under the operation. The allied army was now increased to 3000 men, who were opposed by the prince of Ossory at the head of 5000, strongly entrenched among woods and morasses. By the superior conduct of the English troops, however, the Irish were decoyed from their advantageous situation, and thus were entirely defeated. The English were for keeping the field till they had totally reduced their enemies: but Dermot, accustomed only to ravage and plunder, contented himself with destroying the country; and a sudden reverse of fortune seemed ready to take place. The prince of Ossory, though defeated, still appeared in arms, and only waited for an opportunity of again opposing the enemy in the field.

Maurice Pendergast also joined him with his whole troop, being provoked by Dermot, who had refused him leave to return to Wales. This defection, however, was in part supplied by the arrival of Fitz-Gerald with 10 knights, 30 horsemen, and 100 archers. Pendergast in a short time repented of his new alliance, and retired into Wales; so that the prince was obliged to make his submission to Dermot, which the latter with some reluctance accepted.

In the mean time, Roderic having settled all his other affairs, advanced against the allies with a powerful army. Dermot was thrown into despair; but, encouraged by Fitz-Stephen, he encamped in a very strong situation, where he was soon besieged by Roderic. The latter, however, dreading the valor of the English, condescended to treat, first with them, and then with Dermot, in order to detach them from the interests of each other: but as this proceeded evidently from fear, his offers were rejected by both parties; upon which he began to prepare for battle: but at the very time when the engagement should have commenced, either through the suggestions of his clergy, or of his own fears, Roderic entered into a new negotiation; which at last terminated in a peace. The terms were, that Dermot should acknowledge the supremacy of Roderic, and pay him such service as the monarchs of Ireland had usually received from inferior princes; and as a security for his faithful performance of this article, he delivered up his favourite son as an hostage to Roderic: but in order to establish this accommodation on the firmest basis, the latter obliged himself to give his daughter in marriage to the young prince as soon as Leinster should be reduced, and the peace of the island effectually restored. By a secret article, Dermot engaged to dismiss the British forces immediately after the settlement of his own province, and in the mean time not to bring over any further reinforcements from England.

11
Peace con-
cluded.

Thus ended the first British expedition into Ireland; the consequences of which were so little dreaded at that time by the natives, that their historians, though they dwell upon the provincial wars and contests in other parts of the island, speak of the settlement of the Welshmen in Leinster with a careless indifference. But though the settlement of this colony seemed very little alarming to the generality, it could not escape the observation of discerning persons, that a man of Dermot's character would not long keep his treaties; and that on the first emergency he would have recourse to his former allies, who thus would establish themselves more and more, till at last they would reduce the country entirely under their subjection. These reflections, if any such were then made, were in a short time verified. Dermot was scarce settled in his own dominions, when he began to aspire at the sovereignty, and form schemes for dethroning Roderic. He applied to Fitz-Stephen and Fitz-Gerald; by whom he was again directed to apply to Richard earl of Chepstow, more commonly known by the name of *Strongbow*, on account of his feats of archery. Richard was very much inclined to accept of his invitation; but thought it incumbent upon him first to obtain the consent of king Henry. The king, however, did not incline that his subjects should make conquests for themselves in any other country, and therefore

12.
New machinations
of Dermot.

Ireland. therefore dismissed Richard with an equivocal answer; but the latter being willing to understand his sovereign's words in the most favourable sense, immediately set about the necessary preparations for his expedition. In May 1711, Raymond le Gros, Richard's domestic friend, and the near relation of Fitz-Stephen and Fitz-Gerald, landed at a place called *Donnally*, near Waterford, with 10 knights and 70 archers; and along with them came Hervey of Mountmorres, attended by a small train. The English immediately intrenched themselves, and erected a temporary fort for themselves: which proved a very necessary precaution; for the natives, justly attributing this new debarkation to the practices of Dermot, instantly formed a tumultuous army, and marched to expel the invaders. The English prepared to meet them; but when they perceived the great superiority of the enemy, they thought proper to retire to their fort. Here, however, they must have been totally cut off, had they not luckily collected a numerous herd of cattle from the neighbouring country for their subsistence. These they drove with fury among the Irish, who were thus put into the utmost confusion. The invaders seized the favourable moment; and, falling upon their disordered enemies, put them to flight, and drove great numbers of them into the sea, where they perished. Seventy prisoners were taken, all of them principal citizens of Waterford; who, though they offered large sums for their ransom, and even that the city should be delivered up to the English, were all barbarously put to death. This success and cruelty so intimidated the Irish, that they suffered these merciless invaders to maintain their station unmolested, and wait for the arrival of their associates.

Richard in the mean time having assembled his vassals, led them through Wales, where he was joined by great numbers of other adventurers; but, when just on the point of embarking, was surprised by a positive command from the king, to desist from his intended enterprise, on pain of forfeiture of his lands and honours. He was now, however, too much interested in his scheme to retract; and therefore pretended to disbelieve the authenticity of the royal mandate. On the eve of the feast of St. Bartholomew, he landed at Waterford with 200 knights and 1200 infantry, all chosen and well appointed soldiers. They were immediately joined by Raymond and his troop; and the very next day it was resolved to make an attempt upon Waterford. The city was taken by storm, and a dreadful massacre ensued; to which the cruel Dermot had the merit of putting an end. The marriage of Richard with Eva, the daughter of Dermot, was solemnized without delay, and a scene of joy and festivity succeeded the calamities of war.

A new expedition was now undertaken against Dublin; the inhabitants of which had either manifested some recent disaffection to Dermot, or had never been thoroughly forgiven for their old defection. Roderic advanced against the allied army with a formidable body, consisting, as is said, of 30,000 men; but, fearing to come to a general engagement, he contented himself with some slight skirmishes; after which, great part of his vassals forced him to dismiss them, and Dublin was left to its fate. The inhabitants were treated very severely; how-

ever, a considerable body of them, with Heculph, their governor, had the good fortune to gain some vessels lying in the harbour, and made their escape to the northern islands. Earl Richard was now invested with the lordship of Dublin; and appointed Milo de Cogan, a brave English knight, his governor; while he himself, in conjunction with the forces of Dermot, over-ran the country of Meath, committing every where the most horrid cruelties. Roderic, in the mean time, unable to oppose them in the field, sent deputies to Dermot, commanding him to retire, and putting him in mind that his son was in his hands, and must answer with his life for the breach of those treaties which his father made so little scruple to violate. Natural affection, however, had very little place in the breast of Dermot. He expressed the utmost indifference about his son; and, with the greatest arrogance, claimed the sovereignty of all Ireland: Roderic, provoked at this answer, cut off the young prince's head.

This piece of impotent cruelty served only to make the king odious to his own subjects, while Dermot and his English allies committed every where the greatest devastations, and threatened to subdue the whole island. This indeed they would probably have accomplished, had not the extraordinary success of Strongbow alarmed king Henry; who, fearing that he might render himself totally independent on the crown of Britain, issued his royal edict, strictly forbidding any English vessel from passing into Ireland with men, arms, or provisions; and commanding all his subjects at that time resident in Ireland, of whatever rank or degree, to return to their country before the ensuing feast of Easter, on pain of forfeiting their lands, and being declared traitors.

Our adventurers were plunged into the greatest distress by this peremptory edict. They now found themselves cut off from all supplies in the midst of their enraged enemies, and in danger of being forsaken by those who had attached themselves to them during their success. Raymond was dispatched with a most submissive message to the offended monarch; but before he received any favourable answer, every thing was thrown into confusion by the death of Becket*, so that the king had neither leisure nor inclination to attend to the affairs of Ireland. About the same time the death of Dermot their great ally seemed almost to give a finishing stroke to the English affairs.

An universal defection took place among their associates; and before they had time to concert any proper measures, Heculph, who had formerly escaped from Dublin, appeared before that city with a formidable body of troops armed after the Danish manner. A furious attack ensued; which at last ended in the defeat and captivity of Heculph, who was immediately put to death. This danger, however, was soon followed by one still greater. Roderic had formed a powerful confederacy with many of the Irish chieftains, and the kings of the northern isles, in order to extirpate the English totally from the island. The harbour of Dublin was blocked up by a fleet of 30 ships from the northern isles; while the confederated Irish took their stations in such a manner as to surround the city, and totally cut off all supplies of provisions. In two month's time the English were reduced to great straits.

13
A new body of English arrive in Ireland.

14
Their success and cruelty.

15
Earl Richard arrives with a powerful reinforcement.

16
All the adventures recalled by the king.

* See England, p. 117, 118.

17
Distress of the English.

Ireland.

straits. On the first alarm, Richard had sent for assistance to Fitzstephen; who having weakened his own force, in order to serve the earl, the people of Wexford had risen and besieged Fitzstephen in his fort called *Garrig* near that city. A messenger now arrived, informing Strongbow that his friend was in the utmost danger, and must fall into the hands of his enemies if not assisted within three days; upon which a council of war was called, in order to deliberate on the measures necessary to be pursued in this desperate emergency. It was soon resolved to enter into a treaty with Roderic upon any terms that were not totally servile or oppressive. Laurence prelate of Dublin was appointed to carry the terms; which were, that Richard proposed to acknowledge Roderic as his sovereign, and to hold the province of Leinster as his vassal, provided he would raise the siege. Laurence soon returned with an answer, probably of his own framing; namely, that Dublin, Waterford, Wexford, and all the forts possessed by the British, should be immediately given up; and that the earl and his associates, should depart with all their forces by a certain day, leaving every part of the island free from their usurpations, and absolutely renouncing all their pretended claims. On these conditions they were to be spared; but the least reluctance or delay would determine the besiegers to storm the city.

These terms, though they contained nothing insolent or unreasonable, considering the present situation of the English, were yet intolerable to our indigent adventurers. After some time spent in silence, Milo de Cogan, suddenly starting up, declared his resolution to die bravely rather than submit to the mercy of barbarians. The spirit of desperate valour was instantly caught by the whole assembly; and it was resolved to risk their whole fortune on one desperate effort, by sallying out against the enemy, and to make their attack upon that quarter where Roderic himself commanded. Accordingly, having persuaded a body of the townsmen to take part in this desperate enterprise, they marched out against their enemies, who expected nothing less than such a sudden attack. The besiegers were secure and careless, without discipline or order; in consequence of which, they were unable to sustain the furious assault of the English. A terrible slaughter ensued, and the Irish instantly fled in the greatest confusion; their monarch himself escaping only by mixing half naked with the crowd. The other chieftains who were not attacked caught the panic, and broke up their camps with precipitation; while the victors returned from the pursuit to plunder, and among other advantages gained as much provision as was sufficient to support them for a whole year.

Strongbow being thus relieved from his distresses, committed the government of Dublin to Milo de Cogan, while he proceeded immediately to Wexford in order to relieve Fitzstephen: but in this he was disappointed; for that brave officer, having often repulsed his enemies, was at last treacherously deceived into submission and laid in irons. Strongbow, however, continued to advance; and was again attacked by the Irish, whom he once more defeated. On his arrival at Wexford, he found it burnt to the ground; the enemy having retired with Fitzstephen and the rest of the prisoners to Holy Island, a small island in

the middle of the harbour, from whence they sent a deputation, threatening to put all the prisoners to death if the least attempt was made to molest them in their present situation. The earl then proceeded to Waterford, and from thence to Ferns; where he for some time exercised a regal authority, rewarding his friends and punishing his enemies. A more important object, however, soon engaged his attention. The king of England having settled his affairs as well as he could, now determined to conquer Ireland for himself. A summons was instantly dispatched to earl Richard, expressing the greatest resentment at his presumption and disobedience, and requiring his immediate presence in England. The earl found himself under a necessity of obeying; and having made the best dispositions the time would permit for the security of his Irish possessions, embarked for England, and met the king at Newham near Gloucester. Henry at first affected great displeasure; but soon allowed himself to be pacified by a surrender of the city of Dublin, and a large territory adjacent, together with all the maritime towns and forts acquired by Strongbow; while on his part he consented that the earl should have all his other possessions granted in perpetuity, to be held of the king and his heirs. The other adventurers made their peace in a similar manner; while the Irish chieftains, instead of uniting in the defence of their country, only thought how to make the most of the approaching invasion, or at least how to avert the threatened evils from their own particular districts. They saw the power of their own sovereign on the point of total dissolution; and they saw it with indifference, if not with an envious and malignant satisfaction. Some were even ready to prevent their invader, and to submit before he appeared on the coast. The men of Wexford, who had possessed themselves of Fitzstephen, resolved to avert the consequences of their late perfidy and cruelty, by the forwardness of their zeal for the service of the king of England, and the readiness of their submissions. Their deputies cast themselves at Henry's feet; and, with the most passionate expressions of obedience, humbly intreated that he would accept them as his faithful vassals, ready to resign themselves, their lands, and possessions, to his absolute disposal. "They had already, (they said), endeavoured to approve their zeal by seizing Robert Fitzstephen, a traitor to his sovereign, who had lately entered their territory by force of arms without any due warrant or fair pretence, had slaughtered their people, seized their lands, and attempted to establish himself independent of his liege lord. They kept him in chains, and were ready to deliver him to the disposal of his sovereign."—The king received them with expressions of the utmost grace and favour; commended their zeal in repressing the unwarrantable attempts of Fitzstephen; declared that he should soon inquire into his crimes, and the wrongs they had sustained, and inflict condign punishment for every offence committed by his undutiful subjects.—Thus were the Irishmen dismissed in the utmost joy and exultation; and the artifice of Henry, while it inspired these men with dispositions favourable to his interests, proved also the most effectual means of saving Fitzstephen from their cruelty.

Henry, having completed the preparations necessary

Ireland.

19
Earl Richard summoned to England.

18
They totally defeated their enemies.

for:

Ireland.

20
King Henry
lands in
Ireland.

for his expedition, embarked at Milford with several of his barons, 400 knights, and about 4000 soldiers, on board a fleet of 240 sail. He landed at Waterford on the scaft of St Luke in October 1172; with a professed defign not to conquer, but to take poffeffion of a kingdom already his own, as being granted him by the pope. Most of the Irish indeed feemed to be of the fame opinion, and therefore fubmitted without the leaft refiftance. Strongbow fet them an example, by making a formal furrender of Waterford, and doing homage to the king for the territory of Leinfiter. Fitz-Stephen was delivered up, with many accusations of tyranny and injuftice. He was at firft fent to prifon; but foon purchafed his liberty, by furrendering Wexford, and doing homage for the reft of his poffeffions to the king. The prince of Desmond was the firft Irish chieftain who fubmitted. On the very day after the king's arrival, he attended his court, refigned the city of Corke, did him homage, and ftipulated to pay a tribute for the reft of his territory. An Englifh governor and garrifon were immediately appointed to take poffeffion of his capital; and the king difplayed his power and magnificence by marching to Lifmore, where he chofe a fituation and gave the neceffary orders for building a fort. The prince of Thomond next fubmitted and did homage. He was followed by the princes of Offory, Decies, and all the inferior chiefs of Munfter.

The king, after having provided for the fecurity of all his newly acquired territories, and put garrifons in the cities of Limerick, Corke, Waterford, and Wexford, proceeded to take poffeffion of Dublin, which had been furrendered by Strongbow. The neighbouring lords took the opportunity of fubmitting as he advanced. O'Carrol of Argial, a chieftain of great confequence, repaired to his camp, and engaged to become his tributary; and even O'Ruarc, whom Roderic had made lord of a confiderable part of Meath, voluntarily fubmitted to the new fovereign.

22
Roderic
ftill holds
out.

Roderic, though furprifed at the defection of fo many of his allies, ftill determined to maintain his own dignity, and at leaft preferve his province of Connaught, fcing he could no longer call himfelf monarch of the whole ifland. With this defign he entrenched himfelf on the banks of the Shannon; and now, when difencumbered from a crowd of faithlefs and difcontented followers, he appears to have acted with a fpirit and dignity becoming his ftation. Hugh de Lacy and William Fitz-Andelm were commiffioned by the king to reduce him: but Roderic was too ftrong to be attacked with any probability of fuccefs by a detachment from the Englifh army; and he at leaft affected to believe, that his fituation was not yet fo totally defperate as to reduce him to the neceffity of refigning his dignity and authority, while his own territory remained inviolate, and the brave and powerful chiefs of Ulfter ftill kept retired in their own diftricts without any thoughts of fubmiffion. Henry in the mean time attempted to attach the Irish lords to his interefts by elegant and magnificent entertainments, fuch as to them appeared quite aftonifhing. Some hiftorians pretend that he eftablifhed the Englifh laws in all thofe parts which had fubmitted to his jurifdiction; but this muft appear extremely improbable, when we confider how tenacious a rude and barbarous people are of their an-

Ireland.

cient laws and cuftoms. The Irish lords had been accuftomed to do homage to a fuperior; and they had made no fubmiffion to Henry which they had not formerly done to Roderic, and probably thought their fubmiffion to the king of England more honourable than that to their Irish monarchs; and it cannot be fuppofed, that a wife and politic monarch, fuch as Henry undoubtedly was, fhould form at once fuch an extravagant fcheme as altering the laws of a great number of communities, none of which he had fubdued by force of arms. By his tranfactions both with the natives and adventurers, however, Henry had attained the abfolute dominion of feveral maritime cities and their dependencies; fo that he had both a confiderable number of real fubjects, and a large extent of territory, in the ifland. To thefe fubjects indeed Henry granted the Englifh laws; and gave the city of Dublin by charter to the inhabitants of Briftol, to be held of him and his heirs, with the fame liberties and free cuftoms which they enjoyed at Briftol, and throughout all his land. And, by another charter, executed foon after, he confirmed to his burgefles of Dublin all manner of rights and immunities throughout his whole land of England, Normandy, Wales, and Ireland, wherever they and their effects fhall be, to be fully and honourably enjoyed by them as his free and faithful fubjects. And as it was not eafy to induce his Englifh fubjects immediately to fettle in thefe maritime towns, he permitted the Oftmen to take poffeffion of Waterford; and to them he granted a particular right of denization, whereby they were invefted with the rights and privileges of free fubjects, and for the future to be governed by the laws of his realm. For the better execution of thefe new laws, the king alfo made a divifion of the diftricts now fubject to him into fhires or counties; which was afterwards improved and enlarged, as the extension of the Englifh fettlements and the circumftances of the country required. Sheriffs were appointed both for the counties and cities, with itinerant judges, and other minifters of juftice, and officers of ftate, and every appendage of Englifh government and law. To complete the whole fyftem, a chief governor, or representative of the king, was appointed. His bufinefs was to exercife the royal authority, or fuch parts of it as might be committed to him in the king's abfence; and, as the prefent ftate of Ireland, and the apprehenfions of war or infurrections, made it neceffary to guard againft fudden accidents, it was provided, That in cafe of the death of any chief governor, the chancellor, treafurer, chief-juftices, and chief baron, keeper of the rolls, and king's ferjeant at law, fhould be empowered, with confent of the nobles of the land, to elect a fucceffor, who was to exercife the full power and authority of this office, until the royal pleafure fhould be further known.

But while Henry was thus regulating the government of his new dominions, he received the unwelcome news, that two cardinals, Albert and Theodine, delegated by the pope, had arrived in Normandy the year before, to make inquiry into the death of Becket; that having waited the king's arrival until their patience was exhausted, they now fummoned him to appear without delay, as he would avert the dreadful fentence of excommunication, and preferve his dominions

23

Henry
obliged to
leave Ire-
land.

nions from a general intestine. Such denunciations were of too great consequence to admit of his longer stay in Ireland; he therefore ordered his forces and the officers of his household to embark without delay, reserving three ships for the conveyance of himself and his immediate attendants. Having therefore but a short time to secure his Irish interests, he addressed himself to the original English adventurers, and by grants and promises laboured to detach them from Strongbow, and to bind them firmly to himself. To make amends for what he had taken from Fitz-Stephen, he granted him a considerable district in the neighbourhood of Dublin, to be held by knight's service; at the same time entrusting the maritime towns to his own immediate dependants. Waterford was committed to Humphrey de Bohun, Robert Fitz-Bernard, and Hugh de Guadville, with a train of 20 knights. In Wexford were stationed William Fitz-Andelm, Philip of Hastings, and Philip de Braosa, with a like number of attendants. Hugh de Lacy had a grant of all the territory of Meath, where there was no fortified place, and where of consequence no particular reservation was necessary, to be held of the king and his heirs, by the service of 50 knights, in as full a manner as it had been enjoyed by any of the Irish princes. He also constituted him lord governor of Dublin, with a guard of 20 knights. Robert Fitz-Stephen and Maurice Fitz-Gerald were appointed his coadjutors, with an equal train; and these, with others of the first adventurers, were thus obliged, under the pretence of an honourable employment, to reside at Dublin, subject to the immediate inspection of de Lacy, in whom Henry seems to have placed his chief confidence. Lands were assigned in the neighbourhood of each city for the maintenance of the knights and soldiers. Orders were given to build a castle in Dublin, and fortresses in other convenient places; and to John de Courcey, a baron distinguished by his enterprising genius and abilities for war, was granted the whole province of Ulster, provided he could reduce it by force of arms.

Henry was no sooner gone, than his barons began to contrive how they might best strengthen their own interests, and the Irish how they might best shake off the yoke to which they had so readily submitted. De Lacy parcelled out the lands of Meath to his friends and adherents, and began to erect forts to keep the old inhabitants in awe. This gave offence to O'Ruarc, who still enjoyed the eastern part of this territory as a tributary prince. He repaired to Dublin, in order to obtain redress from Lacy for some injuries real or pretended; but, as the parties could not come to an agreement, another conference was appointed on a hill called *Taragh*. Both parties came with a considerable train of armed followers; and the event was a scuffle, in which O'Ruarc and several of his followers were killed, and which served to render the English not a little odious to the natives.

This spirit of disaffection had soon after an opportunity of shewing itself on the rebellion of king Henry's sons, of which an account is given under the article ENGLAND, n° 110, & seq. The king had been obliged to weaken his forces in Ireland, by withdrawing several of his garrisons. The soldiers who remained were also discontented with their general

Hervey of Mountmorres, on account of his severity in discipline, and restraining them from plunder, to which they imagined themselves intitled on account of the deficiencies of their pay. Raymond le Gros, the second in command, was much more beloved by the soldiery; and to such a height had the jealousies between the commanders arisen, that all effectual opposition to the Irish chieftains was prevented; and the event might have been fatal to the English interest, had not Henry found out a remedy. He summoned earl Richard to attend him at Rouen in Normandy, and communicated his intentions of committing the affairs of Ireland to his sole direction. The earl expressed the utmost readiness to serve his master; but observed, that he had already experienced the envy and malignity of his secret enemies; that if he should appear in such a distinguished character as that of the king's deputy in Ireland, their insidious practices would be renewed, and his conduct misrepresented. He therefore requested that a colleague might be appointed in the commission; and recommended Raymond as a person of approved loyalty and abilities, as well as highly acceptable to the soldiery. The king replied, with an affected air of regard and confidence, that he had his free consent to employ Raymond in any service he should deem necessary; not as a colleague, but as an assistant; but that he relied entirely on the earl himself, and implicitly trusted every thing to his direction. To reward his services, he granted him the town of Wexford, together with a fort erected at Wicklow; and then dismissed him with the most gracious expressions of favour.

The earl landed at Dublin, where he was received with all the respect due to the royal commission. He signified the king's pleasure, that Robert Fitz-Bernard, with the garrison of Waterford, should instantly embark and repair to Normandy; that Robert Fitz-Stephen, and Maurice Pendergast, should attend the service of their sovereign in England; and, agreeably to the king's instructions, took on him the custody of the cities of Dublin, Waterford, and Wexford. Hugh de Lacy, and Milo de Cogan, were, with the other lords, commanded to repair to England for the service of the king; by which the earl's forces were considerably weakened, and he soon found himself under a necessity of appointing Raymond to the chief command. The new general proved successful in some enterprizes against the rebellious Irish; but having presumed upon his merits to demand in marriage Basilila the earl's sister, Richard refused his consent, and Raymond retired into Wales.

Thus the supreme command again devolved upon Hervey of Mountmorres; who, being sensible that his character had suffered much from a comparison with that of Raymond, determined to emulate his successes by some bold attempt against the rebels. A detachment of 400 of his men, however, had the misfortune to be surprized and cut off by the enemy; and this success served as a signal for a general revolt. Several of the Leinster chieftains, who had lately made their revolt of submissions, and bound themselves to the service of the king Henry, now openly disclaimed all engagements. Even Donald Kevanagh, son to the late king Dermot, who had hitherto adhered to the English in their greatest difficulties, now declared against them, and

25
Strongbow
the first go-
vernor of
Ireland.

26
A general
of the Irish.

24
Disorders
arise on
the king's
departure.

Ireland.

Ireland.

27
Roderic
submits
to king
Henry.28
Terms of
his submis-
sion.

claimed a right to the kingdom of Leinster; while Roderic, on his part, was active in uniting the princes of Ulster, the native lords of Meath, and other chiefs, against their common enemy. This produced the immediate recall of Raymond; and Richard no longer refused his consent to the marriage with his sister, which was solemnized immediately on Raymond's arrival. The very next morning, the bridegroom was obliged to take the field against Roderic, who had committed great devastations in Meath. By the vigorous conduct of the English commander, however, he was not only prevented from doing farther mischief, but at last convinced of the folly of resistance; and therefore determined to make a final submission. Yet, conscious of his dignity, he disdained to submit to a subject; and therefore, instead of treating with earl Richard, he sent deputies directly to the king. The deputies were, Catholien archbishop of Tuam, the abbot of St Brandon, and *Master Lawrence*, as he is styled, chancellor of the king of Connaught.

The terms of this submission, by which Henry became sole monarch of Ireland, were as follow: Roderic consented to do homage and pay tribute, as liege-man to the king of England; on which condition he was allowed to hold the kingdom of Connaught, as well as his other lands and sovereignties, in as ample a manner as he had enjoyed them before the arrival of Henry in Ireland. His vassals were to hold under him in peace, as long as they paid their tribute and continued faithful to the king of England; in which Roderic was to enforce their due obedience, and for this purpose to call to his assistance the English government, if necessary. The annual tribute to be paid was every 10th merchantable hide, as well from Connaught, as from the rest of the island; excepting those parts under the immediate dominion of the king of England and his barons, viz. Dublin and Meath with their appurtenances, Wexford and all Leinster, and Waterford with its lands as far as Dungarvan inclusive; in all which districts Roderic was not to interfere, nor claim any power or authority. The Irish who had fled from these districts were to return, and either pay their tribute, or perform the services required by their tenures, at the option of their immediate lords; and, if refractory, Roderic, at the requisition of their lords, was to compel them to return. He was to take hostages from his vassals, such as he and his liege-lord should think proper; and on his part to deliver either these or others to the king, according to the royal pleasure. His vassals were to furnish hawks and hounds annually to the English monarch; and were not to detain any tenant of his immediate demesnes in Ireland, contrary to his royal pleasure and command. This treaty was solemnly ratified in a grand council of prelates and temporal barons, among whom we find the archbishop of Dublin one of the subscribing witnesses. As metropolitan of Leinster, he was now become an English subject, and was probably summoned on this occasion as one obliged to attend, and who had a right to assist in the king's great council. It is also observable, that Henry now treated with Roderic not merely as a provincial prince, but as monarch of Ireland. This is evidently implied and supposed in the articles; although his monarchical powers and privileges were

little more than nominal, frequently disregarded and opposed by the Irish toparchs. Even by their submissions to Henry, many of them in effect disavowed and renounced the sovereignty of Roderic; but now his supremacy seems to be industriously acknowledged, that the present submission might appear virtually the submission of all the subordinate princes, and thus the king of England be invested with the sovereignty of the whole island. The marks of sovereignty, however, were no more than homage and tribute: in every other particular, the regal rights of Roderic were left inviolate. The English laws were only to be enforced in the English pale: and, even there, the Irish tenant might live in peace, as the subject of the Irish monarch; bound only to pay his quota of tribute, and not to take arms against the king of England.

But though the whole island of Ireland thus became subject to the king of England, it was far from being settled in tranquillity, or indeed from having the situation of its inhabitants mended almost in any degree. One great occasion of disturbance was, that the English laws were confined only to those parts which had been subdued by force of arms; while the chieftains that had only submitted to pay tribute, were allowed to retain the ancient Irish laws within the limits of their own jurisdictions. By these old Irish laws, many crimes accounted capital with us, such as robbery, murder, &c. might be compensated by a sum of money. Hence it happened, that very unequal punishments were inflicted for the same offence. If one Englishman killed another, he was punished with death; but if he killed an Irishman, he was punished only by a fine. If an Irishman, on the other hand, killed an Englishman, he was certainly punished with death: and as in times of violence and outrage, the crime of murder was very frequent, the circumstance just mentioned tended to produce an implacable hatred between the original inhabitants and the English. As the Irish laws were thus more favourable to the barbarity natural to the tempers of some individuals, many of the English were also tempted to lay aside the manners and customs of their countrymen altogether, and to associate themselves with the Irish, that, by becoming subject to their laws, they might thus have an opportunity of gratifying their brutal inclinations with less controul than formerly; and in process of time, these *degenerate English*, as they were called, proved more bitter enemies to their countrymen than even the Irish themselves.

Another cause of the distresses of Ireland was, the great power of the English barons, among whom Henry had divided the greatest part of his Irish dominions. The extent of their authority only inflamed them with a desire for more; and, instead of contributing their endeavours to increase the power of their sovereign, or to civilize the barbarous people over whom they were placed, they did every thing in their power to counteract and destroy each other. Henry himself, indeed, seems to have been infected with a very fatal jealousy in this respect; for, though the abilities and fidelity of Raymond had abundantly manifested themselves, the king never could allow himself to continue him in the government of the island: and the consequence of degrading him never failed to be a scene of uproar and confusion. To these two reasons

29
Causes of
the subse-
quent dis-
tresses of
Ireland.

Ireland.

we must likewise add another; namely, that in those parts of the kingdom where the Irish chieftains enjoyed the sovereignty, they were at full liberty to make war upon each other as formerly, without the least restraint. This likewise induced many of the English to degenerate, that they might have an opportunity of sharing the plunder got by these petty wars; so that on the whole, the island was a perpetual scene of horror, almost unequalled in the history of any country.

30
Fitz-Andelm's bad government.

After the death of earl Richard, Raymond was immediately elected to succeed him; but was superseded by the king, who appointed William Fitz-Andelm, a nobleman allied to Raymond, to succeed in his place. The new governor had neither inclination nor abilities to perform the task assigned to him. He was of a rapacious temper, sensual and corrupt in his manners; and therefore only studied to enrich himself. The native Irish, provoked by some depredations of the English, commenced hostilities; but Fitz-Andelm, instead of repressing these with vigour in the beginning, treated the chieftains with affected courtesy and flattery. This they had sufficient discernment to see, and to despise; while the original adventurers had the burden of the whole defence of the *English pale*, as the English territories were called, thrown upon them, at the same time that the bad conduct of the governor was the cause of perpetual disorders. The consequence of this was, that the lords avowed their hatred of Fitz-Andelm: the soldiers were mutinous, ill-appointed, and unpaid; and the Irish came in crowds to the governor with perpetual complaints against the old adventurers, which were always decided against the latter; and this decision increased their confidence, without lessening their disaffection.

In this unfavourable state of affairs, John de Courcy, a bold adventurer, who had as yet reaped none of the benefits he expected, resolved to undertake an expedition against the natives, in order to enrich himself with their spoils. The Irish at that time were giving no offence; and therefore pleaded the treaty lately concluded with King Henry: but treaties were of little avail, when put in competition with the necessities of an indigent and rapacious adventurer. The consequence was, that the flame of war was kindled through the whole island. The chieftains took advantage of the war with the English, to commence hostilities against each other. Desmond and Thomond, in the southern province, were distracted by the jealousies of contending chiefs, and the whole land was wasted by unnatural and bloody quarrels. Treachery and murder were revenged by practices of the same kind, in such a manner as to perpetuate a succession of outrages the most horrid, and the most disgraceful to humanity. The northern province was a scene of the like enormities; though the new English settlers, who were considered as a common enemy, ought to have united the natives among themselves. All were equally strangers to the virtues of humanity; nor was religion, in the form it then assumed, capable of restraining these violences in the least.

31
He is superseded by Hugh de Lacey.

Ireland was thus in a short time reduced to such a state, that Henry perceived the necessity of recalling Fitz-Andelm, and appointing another governor. He was recalled accordingly; and Hugh de Lacey ap-

pointed to succeed him. He left his government without being regretted, and is said by the historians of those times to have done only one good action during the whole course of his administration. This action was nothing more important, than the removing of a relic, called the *staff of Jesus*, from the cathedral of Armagh to that of Dublin: probably that it might be in greater safety, as the war raged violently in Ulster. De Lacey, however, was a man of a quite different disposition, and every way qualified for the difficult government with which he was invested: but at the same time, the king, by investing his son John with the lordship of Ireland, gave occasion to greater disturbances than even those which had already happened.

Ireland.

The nature of this lordship hath been much disputed; but the most probable opinion is, that the king's son was now to be invested with all the rights and powers which had formerly belonged to Roderic, who was allowed the title of *king of Ireland*. It doth not appear, indeed, that Henry had any right to deprive Roderic of these powers, and still less had he to dispose of any of the territories of those chieftains who had agreed to become his tributaries; which nevertheless he certainly did, and which failed not to be productive of an immediate war with these chiefs.

32
Prince John made lord of Ireland.

The new governor entered on his office with all that spirit and vigour which was necessary; but being misrepresented to the king by some factious barons, he was in a short time recalled, and two others, totally unfit for the government, appointed in his room. This error was soon corrected, and Lacey was replaced in three months. The same jealousy which produced his first degradation, soon produced a second; and Philip de Braosa, or *Philip of Worcester*, as he is called, a man of a most avaricious disposition, was appointed to succeed him. This governor behaved in such a manner, that his superstitious subjects expected every moment that the vengeance of heaven would fall upon him, and deliver them from his tyranny. His power, however, was of short duration; for now prince John prepared to exercise the authority with which his father had invested him in Ireland. He was attended by a considerable military force: his train was formed of a company of gallant Normans in the pride of youth; but luxurious, insolent, and followed by a number of Englishmen, strangers to the country they were to visit, desperate in their fortunes, accustomed to a life of profligacy, and filled with great expectations of advantage from their present service. The whole assembly embarked in a fleet of 60 ships; and arrived at Waterford after a prosperous voyage, filling the whole country with the greatest surprise and expectation.

The young prince had not yet arrived at the years³³ of discretion; nor indeed, from his subsequent conduct, doth it appear that his disposition was such as qualified him in the least for the high dignity to which he was raised. The hardy Welshmen who first migrated into Ireland, immediately waited upon him to do him homage; but they were disagreeable to the gay courtiers, and to the prince himself, who minded nothing but his pleasures. The Irish Lords were at first terrified by the magnificent representation of the force of the English army; and being reconciled to submission by the dignity of the prince's station, hastened in crowds to Waterford to do him homage.

Ireland.

Ireland.

They exhibited a spectacle to the Norman courtiers, which the latter did not fail to treat with contempt and ridicule. The Irish Lords, with uncouth attire, thick bushy beards, and hair standing on end, advanced with very little ceremony; and, according to their own notions of respect, offered to kiss the young prince. His attendants stepped in, and prevented this horrid violation of decorum by thrusting away the Irishmen. The whole assembly burst into peals of laughter, pulled the beards, and committed several other indignities on the persons of their guests; which were immediately and severely repented. The chieftains left the court, boiling with indignation; and meeting others of their countrymen halting to do homage to the prince, they informed them of the reception they themselves had met with. A league was instantly formed to extirpate the English, and the whole nation flew to arms; while John and his courtiers, instead of opposing the enemy, employed themselves in harassing and oppressing those who were under their immediate jurisdiction. The country was therefore over-run by the barbarians, agriculture entirely neglected, and a dreadful famine threatened to follow the calamities of war.

34
A general
revolt.

This terrible desolation had continued for eight months before the king was fully acquainted with it. He then determined to recal his son; but was at a loss whom he should name for his successor. Lacey had been murdered by an Irish peasant, and the king was at last obliged to have recourse to John de Courcey, whose boisterous valour seemed now to be absolutely necessary to prevent the English from being totally exterminated. The new governor was obliged at first to act on the defensive; but as his enemies soon forgot their league, and began their usual hostilities against each other, he was at last enabled to maintain his authority of the English government, and to support their acquisitions in Ireland, though not to extend them.

35
Suppressed
by John de
Courcey.

36
Miserable
state of Ire-
land under
Richard I.

In this situation were the affairs of Ireland when Henry II. died, and was succeeded by his son Richard I. The new king was determined on an expedition to the holy land, which left him no leisure to attend to the affairs of Ireland. John, by virtue of the powers granted him by his father, took upon him the management of Irish affairs; and immediately degraded de Courcey from his government, appointing in his place Hugh de Lacey the younger. De Courcey, provoked at this indignity, retired into Ulster, where he was immediately engaged in a furious war with the natives, and at last almost entirely detached himself from the English government. The greatest confusion ensued; Hugh de Lacey was recalled from his government, and William Petit, earl marshal of England, appointed in his place. Petit's administration proved more unfortunate than that of any of his predecessors. Confederacies every where took place against the English; the latter were every where defeated, their towns taken; and their power would certainly have been annihilated, had not the Irish, as usual, turned their arms against each other.

37
Somewhat
better under
John.

In this desperate situation matters continued during the whole reign of king Richard, and part of the reign of John, while the distresses of the country were increased by the dissensions and disaffection of the Eng-

lish lords, who aspired at independency, and made war upon each other like Irish chieftains. The prudent conduct of a governor named *Meiler Fitz-Henry*, however, at last put an end to these terrible commotions; and about the year 1208, the kingdom was more quiet than it had been for a long time before. In 1210, John came over to Ireland in person with an army, with a design, as he said, to reduce his refractory nobles to a sense of their duty. More than 20 Irish chiefs waited upon him immediately to do him homage; while three of the English barons, Hugh and Walter de Lacy, and William de Braosa, fled to France. The king, at the desire of his Irish subjects, granted them, for their information, a regular code and charter of laws, to be deposited in the exchequer of Dublin, under the king's seal. For the regular and effectual execution of these laws, besides the establishment of the king's courts of judicature in Dublin, there was now made a new and more ample division of the king's lands of Ireland into counties, where the sheriffs, and many other officers, were appointed. These counties were, Dublin, Meath, Kildare, Argial, now called *Louth*, Katherlagh, Kilkenny, Wexford, Waterford, Cork, Kerry, Limerick, Tipperary; which marks the extent of the English dominions at this time as confined to a part of Leinster and Munster, and to those parts of Meath and Argial which lie in the province of Ulster, as now defined. Before his departure, the king gave liberty to John de Grey, bishop of Norwich, whom he appointed governor, to coin money of the same weight with that of England; and which, by royal proclamation, was made current in England as well as Ireland.

This ecclesiastical governor is said to have managed affairs so happily, that, during the violent contests between John and his barons, Ireland enjoyed an unusual degree of tranquillity. We are not to imagine, however, that this unhappy country was at this or indeed any other period, till the end of Queen Elizabeth's reign, perfectly free from disorders, only they were confined to those districts most remote from the English government. In 1219, the commotions were renewed, through the immeasurable ambition and contentions of the English barons, who despised all controul, and oppressed the inhabitants in a terrible manner. The disorders in England during the reign of Henry III. encouraged them to despise the royal authority; they were ever the secret enemies, and sometimes the avowed adversaries, of each other; and in many places where they had obtained settlements, the natives were first driven into insurrections by their cruelty, and then punished with double cruelty for their resistance. The English laws, which tended to punish the authors of these outrages, were scorned by an imperious aristocratic faction, who, in the phrenzy of rapine and ambition, trampled on the most salutary institutions. In 1228, a remonstrance was presented to the king against this dangerous neglect and suspension of the laws; which he answered by a mandate to the chief governor, directing that the whole body of nobility, knights, free tenants, and bailiffs of the several counties, should be convened; that the charter of English laws and customs received from king John, and to which they were bound by oath, should be read over in their presence; that they should be directed

for

39
Relapses
into its former
state
under Hen-
ry III.

for the future strictly to observe and adhere to these; and that proclamation should be made in every county of Ireland, strictly enjoining obedience, on pain of forfeiture of lands and tenements. How little effect was produced by this order, we may learn from another, dated in 1246; where the barons are commanded, for the peace and tranquillity of the land, to permit it to be governed by the laws of England.

39
Excessive
depravation
of manners.

Nothing indeed can be conceived more terrible than the state of Ireland during the reign of Henry III. People of all ranks appear to have been sunk in the lowest degree of depravity. The powerful English lords not only subverted the peace and security of the people, by refusing to admit the salutary laws of their own country, but behaved with the utmost injustice and violence to the natives who did not enjoy the benefits of the English constitution. The clergy appear to have been equally abandoned with the rest: nor indeed could it be otherwise; for, through the partialities of Henry himself, the neglected, the worthless, and the depressed among the English clergy, found refuge in the church of Ireland. What were the manners of these clergy, will appear from the following petition of a widow to king Edward I.

"Margaret le Blunde, of Cashel, petitions our lord the king's grace, that she may have her inheritance which she recovered at Chonnell before the king's judges, &c. against David Macmackerwayt bishop of Cashel.

"Item, the said Margaret petitions redress on account that her father was killed by the said bishop.

"Item, for the imprisonment of her grandfather and mother, whom he shut up and detained in prison until they perished by famine, because they attempted to seek redress for the death of their son, father of your petitioner, who had been killed by the said bishop.

"Item, for the death of her six brothers and sisters, who were starved to death by the said bishop, because he had their inheritance in his hands at the time he killed their father.

"And it is to be noted, that the said bishop had built an abbey in the city of Cashel, on the king's lands granted for this purpose, which he hath filled with robbers, who murder the English, and depopulate the country; and that when the council of our lord the king attempts to take cognizance of the offence, he fulminates the sentence of excommunication against them.

"It is to be noted also, that the said Margaret has five times crossed the Irish sea. Wherefore, the petitions for God's sake, that the king's grace will have compassion, and that she may be admitted to take possession of her inheritance.

"It is further to be noted, that the aforesaid bishop hath been guilty of the death of many other Englishmen besides that of her father; and that the aforesaid Margaret hath many times obtained writs of our lord the king, but to no effect, by reason of the influence and bribery of the said bishop.

"She further petitions, for God's sake, that she may have costs and damages, &c."

40
Little alleviation under Edward I.

Matters continued in the same deplorable state during the reign of Edward I. with this additional grievance, that the kingdom was infested by invasions of the Scots. The English monarch indeed possessed all

that prudence and valour which were necessary to have reduced the island to a state of tranquillity; but his project of conquering Scotland left him but little leisure to attend to the distracted state of Ireland. Certain it is, however, that the grievous distress of that country gave him great uneasiness; so that he transmitted his mandate to the prelates of Ireland, requiring them to interpose their spiritual authority for composing the public disorders. About the same time, the Irish who lay contiguous to the English, and who dwelt among them, presented a petition to the king, offering to pay him 8000 merks, upon condition that they were admitted to the privileges of English subjects. To this petition he returned a favourable answer; but his good intentions were defeated by the licentious nobility, who knew that these laws would have circumscribed their rapacious views, and controuled their violence and oppression. Petitions of the same kind were several times repeated during this reign, but as often defeated; though some means were used for the peace of the kingdom, such as the frequent calling of parliaments, appointing sheriffs in some new counties, &c.

These means were not altogether without effect. They served to give some check to the disorders of the realm, though by no means to terminate or subdue them. The incursions of the natives were repressed, and the English lords began to live on better terms with each other; and, in 1311, under Edward II. the most powerful of them were reconciled by the marriage of Maurice and Thomas Fitz John, afterwards the heads of the illustrious houses of Desmond and Kildare, to two daughters of the earl of Ulster. But just at this happy period, when the nation seemed to have some prospect of tranquillity, more dreadful calamities than any hitherto related were about to take place. The Scots had just recovered their liberty under Robert Bruce, and were now in no danger of being again enslaved by a foreign power. Edward, the king's brother, as a recompence for his services, demanded a share of the royal authority. This was refused by Robert, and Edward was for the present satisfied by being declared heir apparent to the crown. But the king, wisely considering the necessity of finding out some employment for a youth of such an aspiring and ambitious disposition, pointed out to his brother the island of Ireland, the conquest of which would be easy, on account of the distracted state in which it almost always was, and which would make him an independent sovereign. This proposal was eagerly embraced by Edward, and every thing necessary for the expedition immediately got ready. On the 25th of May 1315, he landed on the north-eastern coast of Ireland with 6000 men, to assert his claim to the sovereignty of this kingdom. The Irish lords of Ulster, who had invited and encouraged him to this enterprise, were now prepared to receive their new monarch, stocked with eagerness to his standard, and prepared to wreak their vengeance on the common enemy. Their progress was marked by desolation and carnage. The English settlers were slaughtered, or driven from their possessions, their castles levelled with the ground, and their towns set on fire. The English lords were neither prepared to resist the invasion, nor sufficiently united among themselves. The consequence was, that the

41
Invasion of
the Scots
in the
reign of
Edward II.

the enemy for some time met with no interruption. An intolerable scarcity of provisions, however, prevented Bruce from pursuing his advantages; and tho' his brother landed in Ireland with a powerful army, the famine prevented him from being of any essential service. The forces which he left behind him, however, proved of considerable advantage; and by means of this reinforcement, he was enabled to take the city of Carrickfergus.

The terrible devastations committed by Bruce and his associates, now induced some English lords to enter into an association to defend their possessions, and repel these invaders. For this purpose, they raised a considerable body of forces; which coming to an engagement with Fedlim prince of Connaught, one of Bruce's principal allies, entirely defeated and killed him with 8000 of his men. This defeat, however, had very little effect on the operations of Bruce himself. He ravaged the country to the walls of Dublin, traversed the district of Ossory, and penetrated into Munster, destroying every thing with fire and sword. The English continued to augment their army, till at last it amounted to 30,000 men; and then Bruce, no longer able to oppose such a force, found it necessary to retire into the province of Ulster. His retreat was effected with great difficulty; and during the time of his inactivity, the distresses of his army increased to such a degree, that they are said to have fed upon the bodies of their dead companions. At last an end was put to the sufferings and the life of this adventurer in the battle of Dundalk, in 1318, where he was defeated and killed by the English under Sir Robert Birmingham. A brave English knight, named *Maupas*, had rushed forward to encounter Bruce himself, and both antagonists had killed each other; the body of *Maupas* being found, after the battle, stretched upon that of Bruce. The king of Scotland had been advancing with powerful succours to his brother; but Edward, confident of victory, refused to wait his arrival; and Robert, on hearing of his brother's death, instantly retired.

The defeat of the Scottish invaders did not put an end to the disturbances of this unhappy country. The contentions of the English with one another, of the Irish with the English, and among themselves, still kept the island in a state of the utmost barbarity and confusion. An attempt was made indeed, in the reign of Edward II. to establish an university in Dublin; but for want of proper encouragement the institution for some time languished, and then expired amidst the confusion and anarchy of the country. The reign of Edward III. proved not much more favourable than preceding times had been. He was too much taken up with the idea of conquering France, to pay much regard to the interests of Ireland. The unhappy people, indeed, sensible of their own miseries, petitioned the king to admit all his subjects in Ireland to a participation of the English laws; but the petition being delivered as usual to the chief governor, and laid before the parliament, it was either clandestinely defeated or openly rejected. A new scene of tumult and bloodshed immediately ensued; which at last produced an order from the king, prohibiting all Irishmen, or Englishmen married and having estates in Ireland, from bearing any public office whatever.—

This, instead of having a tendency to promote peace, made the disorders much greater than before; and at last produced a remonstrance from the states met at Kilkenny, in which they grievously complain not only of the disorders of the kingdom, but also of the conduct of the king himself in the edict abovementioned: and to this remonstrance the king thought proper to give a gracious and condescending answer, in order to procure for Ireland the succours he wanted in his expedition against France.

It is not to be supposed, that mere promises, assisted by any vigorous exertion, could make the least alteration in the state of a kingdom involved in so much misery. The disorders, however, at last became insupportable to the inhabitants themselves; and a parliament was summoned in 1367, the result of which was the famous statute of Kilkenny. The preamble to this act recites, that the English had become more Irish in their language, names, apparel, and manner of living; had rejected the English laws, and submitted to those of the Irish, with whom they had united by marriage-alliance, to the ruin of the common-wealth.—It was therefore enacted, that marriage, nurture of infants, &c. with the Irish, should be considered and punished as high treason.—Again, if any man of English race shall use an Irish name, the Irish language, or the Irish apparel, or any mode or custom of the Irish, the act provides, that he shall forfeit lands and tenements, until he hath given security in the court of chancery to conform in every particular to the English manners; or if he have no lands, that he shall be imprisoned till the like security be given. The Breton law was pronounced to be a pernicious custom and innovation lately introduced among the English subjects; and it was therefore ordained, that in all their controversies they should be governed by the common law of England; and that whoever should submit to the Irish jurisdiction, should be adjudged guilty of high treason. As the English had been accustomed to make war or peace with the bordering Irish at pleasure, they were now expressly prohibited from levying war without special warrant from the state.—It was also made highly penal for the English to permit their Irish neighbours to graze their lands, to present them to ecclesiastical benefices, or to receive them into monasteries or religious houses; to entertain their bards, who perverted their imaginations by romantic tales; or their news-tellers, who seduced them by false reports.—It was made felony to impose or cede any forces upon the English subject against his will. And as the royal liberties and franchises were become sanctuaries for malefactors, express power was given to the king's sheriffs to enter into all franchises, and there to apprehend felons and traitors.—Lastly, because the great lords, when they levied forces for the public service, acted with partiality, and laid unequal burthens upon the subjects, it was ordained that four wardens of the peace in every county should adjudge what men and armour every lord or tenant should provide.—The statute was promulged with particular solemnity; and the spiritual lords, the better to enforce obedience, denounced an excommunication on those who should presume to violate it in any instance.

This statute, it is evident, could not tend to promote the peace of the kingdom. This could only have

41
They are
totally de-
feated.

43
Miseries of
the Irish
under Edward III.

44
Statute of
Kilkenny.

have been done by removing the animosity between the native Irish and English; but so far was the statute of Kilkenny from having any tendency of this kind, that it manifestly tended to increase the hatred between them. During the whole of this reign, therefore, the state of the Irish government continued to be greatly disordered and embroiled. The English interest gradually declined; and the connections of the king's subjects with the original inhabitants, occasioned by their vicinity and necessary intercourse, in despite of all legal injunctions, obliged the king to relax the severity of the statutes of Kilkenny, in cases where they proved impracticable, or oppressive in the execution. The perpetual hostility, however, in which the different parties lived, proved an effectual bar to the introduction of those arts which contribute to the comfort and refinement of mankind. Even foreign merchants could not venture into such a dangerous country without particular letters of protection from the throne. The perpetual succession of new adventurers from England, led by interest or necessity, served only to inflame dissension, instead of introducing any essential improvement. Lawyers sent from England were notoriously insufficient, if not corrupt; and, as such, had frequently been the objects of complaint. The clergy were a mean grovelling race, totally influenced by the crown. Even prelates were commonly made the inferior agents of government in collecting forces, and raising war against the Irish enemy; but were not to be enticed into this service, except by remittances from the exchequer. Attendance in parliament they dreaded as the greatest hardship; and either resorted to mean excuses to avert the penalty of absence, or sued to the king to be exempted by patent from contributing or assenting to those laws by which they were to be governed.

In this deplorable situation the kingdom continued till the time of Henry VII. who laid the foundation of the future civilization of the Irish, as he also did of the English nation. This he effected by enacting some salutary laws, and appointing faithful and active governors to see them put in execution. Of these governors Sir Edward Poyning's contributed more than any other to the tranquillity of the state. During his administration was enacted the law known by the name of *Poyning's Law*, and which hath since been the subject of much political debate. The purport of it was, That no parliament should be held in that island without first giving notice to the king of England, and acquainting him with the acts to be passed in that parliament; neither should any act passed, or any parliament held, without the approbation of the king and council, be deemed valid. Thus was the power of the turbulent barons greatly broken; and the governor, not having it in his power to assemble parliaments when he pleased, became a person of much less consequence. The whole Irish legislation also became dependent on that of England, and hath ever since continued to be so.

From this time we may date the revival of the English power in Ireland; which from the Scottish war in the time of Edward II. had gradually declined into a miserable and precarious state of weakness. The authority of the crown, which had at last been defied, insulted, and rejected, even in the English territory, was

restored and confirmed, and the rebellions vigorously opposed and suppressed. The feignory of the British crown over the whole body of the Irish, which in former reigns seemed to have been totally forgotten, was now formally claimed and asserted, and some of the most ferocious chieftains by their marriage-connections became the avowed friends of the English power. An ignominious tribute, called the *Black Rent*, was indeed still paid to some chieftains; but their hostilities were opposed and chastised, and even in their own districts they were made to feel the superiority of English government.

During the reign of Henry VIII. the Irish affairs were neglected; and the disorders, which had only been checked, and never thoroughly eradicated, returned as usual. They were further promoted by the innovations in religion which the king introduced, and which were exceedingly disagreeable both to English and Irish. The Reformation, however, continued to make some progress, though slowly, during the reign of Edw. VI. and even in the reign of queen Mary; for as the persecution did not reach thither, many Protestants fled to Ireland in order to avoid the queen's cruelty. The machinations of the Spaniards against queen Elizabeth excited the Irish to fresh insurrections. The king of Spain, indeed, not only encouraged the natives in those insurrections, but actually sent over troops to assist them in driving out the English altogether. This they had well nigh effected; but the Spaniards, upon seeing an army of Irish defeated by an handful of their enemies, were so much provoked, that they surrendered all the places they had made themselves masters of, and even offered to assist the English in reducing the rebels; though it was not thought proper to accept of their assistance. The consequence of this was, that the Irish, abandoned by these allies, were unable to carry on the war; and the grand rebel O'Neal of Tir-owen, or Tirone, after much treachery, evasion, and many pretended submissions, was at last obliged to submit in good earnest. He fell upon his knees before the deputy, and petitioned for mercy with an air and aspect of distress. He subscribed his submission in the most ample manner and form. He implored the queen's gracious commiseration; and humbly sued to be restored to his dignity, and the state of a subject, which he had justly forfeited. He utterly renounced the name of *O'Neal*, which he had assumed on account of the great veneration in which it was held among the Irish. He abjured all foreign power, and all dependency except on the crown of England; resigned all claim to any lands excepting such as should be conferred upon him by letters patent; promising at the same time to assist the state in abolishing all barbarous customs, and establishing law and civility among his people. The lord deputy, on the part of the queen, promised a full pardon to him and all his followers; to himself the restoration of his blood and honours, with a new patent for his lands, except some portions reserved for certain chieftains received into favour, and some for the use of English garrisons.

No insurgent now remained in this kingdom who had not obtained or sued for mercy. Many, indeed, were driven by necessity to the continent, and earned a subsistence by serving in the armies of Spain; and thus a race of Irish exiles was trained to arms, filled with a

47
All the disorders ended in the reign of queen Elizabeth.

45
The power of the English survives under Henry VII.

46
Poyning's law.

Ireland.

Ireland.

47
Exorbitant
prices of
provisions
at that
time.

48
The Irish
civilized by
James I.

malignant resentment against the English. Thus the honour of reducing all the enemies of the crown of England in this island, after a continued contest for 440 years, was reserved for the arms of Elizabeth. The ghastliness of famine and desolation was now somewhat enlivened by the restoration of tranquillity. Indeed, from the most authentic accounts, the prices of provisions were so high, that, considering the value of money at that time, it is surprising how the inhabitants could subsist. From an account of the rates of provisions taken by the mayor of Dublin in 1602, it appears, That wheat had risen from 36s. to 9 l. the quarter; barley-malt from 10s. to 43s. the barrel; oat-malt from 5s. to 22s. the barrel; pease from 5s. to 40s. the peck; oats from 3s. 4 d. to 20s. the barrel; beef from 26s. 8 d. to 8 l. the carcass; mutton from 3s. to 26s. the carcass; veal from 10s. to 29s. the carcass; a lamb from 12 d. to 6s.; a pork from 8s. to 20s.

Under James I. Ireland began to assume a different appearance. That monarch valued himself upon promoting the arts of peace, and made it his study to civilize his barbarous Irish subjects. By repeated conspiracies and rebellions, a vast tract of land had escheated to the crown in six northern counties, Tyrconnel, now called *Donnegal*, Tirone, Derry, Farmanagh, Cavan, and Armagh, amounting to about 500,000 acres; a tract of country covered with woods, where rebels and banditti found a secure refuge, and which was declined to lie waste without the timely interposition of government. James resolved to dispose of these lands in such a manner as might introduce all the happy consequences of peace and cultivation. He caused surveys to be taken of the several counties where the new settlements were to be established; described particularly the state of each; pointed out the situations proper for the erections of towns and castles; delineated the characters of the Irish chieftains, the manner in which they should be treated, the temper and circumstances of the old inhabitants, the rights of the new purchasers, and the claims of both; together with the impediments to former plantations, and the methods of removing them.

At his instances it was resolved, that the persons to whom lands were assigned should be either new undertakers from Great Britain, especially from Scotland, or *servitors*, as they were called; that is, men who had for some time served in Ireland, either in civil or military offices; or old Irish chieftains or captains. Among the last were included even those Irish who had engaged in the rebellion of Tirone, and still harboured their secret discontents. To gain them, if possible, by favour and lenity, they were treated with particular indulgence. Their under-tenants and servants were allowed to be of their own country and religion; and, while all the other planters were obliged to take the oath of allegiance, they were tacitly excepted. The servitors were allowed to take their tenants either from Ireland or Britain, provided no Popish recusants were admitted. The British undertakers were confined to their own countrymen.

In the plantations which had been formerly attempted, the Irish and English had been mixed together, from a fond imagination that the one would have learned civility and industry from the other. But expe-

rience had now discovered, that this intercourse served only to make the Irish envy the superior comforts of their English neighbours, and to take the advantage of a free access to their houses to steal their goods and plot against their lives. It was therefore deemed necessary to plant them in separate quarters; and in the choice of these situations, the errors of former times were carefully corrected. The original English adventurers, on their first settlement in Ireland, were captivated by the fair appearance of the plain and open districts. Here they erected their castles and habitations; and forced the old natives into the woods and mountains, their natural fortresses. There they kept themselves unknown, living by the milk of their kine, without husbandry or tillage; there they increased to incredible numbers by promiscuous generation; and there they held their assemblies, and formed their conspiracies without discovery. But now the northern Irish were placed in the most open and accessible parts of the country, where they might lie under the close inspection of their neighbours, and be gradually habituated to agriculture and the mechanic arts. To the British adventurers were assigned places of the greatest strength and command; to the servitors, stations of the greatest danger, and greatest advantage to the crown: but as this appeared a peculiar hardship, they were allowed guards and entertainment, until the country should be quietly and completely planted.

The experience of ages had shewn the inconvenience of enormous grants to particular lords, attended with such privileges as obstructed the administration of civil government: and, even in the late reign, favourite undertakers had been gratified with such portions of land as they were by no means able to plant. But, by the present scheme, the lands to be planted were divided in three different proportions; the greatest to consist of 2000 English acres, the least of 1000, and the middle of 1500. One half of the escheated lands in each county was assigned to the smallest, the other moiety divided between the other proportions; and the general distributions being thus ascertained, to prevent all disputes between the undertakers, their settlements in the respective districts were to be determined by lot. Estates were assigned to all, to be held of them and their heirs. The undertakers of 2000 acres were to hold of the king *in capite*; those of 1500 by knights service; those of 1000 in common socage. The first were to build a castle, and inclose a strong court-yard, or *barrow*, as it was called, within four years; the second, to finish an house and bawn within two years; and the third, to inclose a bawn; for even this rude species of fortification was accounted no inconsiderable defence against an Irish enemy. The first were to plant upon their lands, within three years, 48 able men of English or Scottish birth, to be reduced to 20 families; to keep a demesne of 600 acres in their own hands; to have four free-farmers on 120 acres each; six lease-holders, each on 100 acres; and on the rest, eight families of husbandmen, artificers, and cottagers. The others were under the like obligations proportionably. All were, for five years after the date of their patents, to reside upon their lands either in person, or by such agents as should be approved by the state, and to keep a sufficient quantity of arms for their defence. The British and servitors were not to

alienate

alienate their lands to mere Irish, or to demise any portions of them to such persons as should refuse to take the oaths to government; they were to let them at determined rents, and for no shorter term than 21 years or three lives. The houses of their tenants were to be built after the English fashion, and united together in towns or villages. They had power to erect manours, to hold courts baron, and to create tenures. The old natives, whose tenures were granted in fee-simple, to be held in socage, were allowed the like privileges. They were enjoined to let their lands at certain rents, and for the like terms as the other undertakers; to take no Irish exactions from their inferior tenants, and to oblige them to forsake their old Scythian custom of wandering with their cattle from place to place for pasture, or *creaghting*, as they called it, to dwell in towns, and conform to the English manner of tillage and husbandry. An annual rent from all the lands was reserved to the crown for every 60 English acres, six shillings and eight pence from the undertakers, ten shillings from servitors, and 13 shillings and four pence from Irish natives. But for two years they were exempt from such payments, except the natives, who were not subject to the charge of transportation. What gave particular credit to this undertaking, was the capital part which the city of London was persuaded to take in it. The corporation accepted of large grants in the county of Derry; they engaged to expend L. 20,000 on the plantation, to build the cities of Derry and Colerain, and stipulated for such privileges as might make their settlements convenient and respectable. As a competent force was necessary to protect this infant plantation, the king, to support the charge, instituted the order of baronets, an hereditary dignity, to be conferred on a number not exceeding 200; each of whom, on passing his patent, was to pay into the exchequer such a sum as would maintain 30 men in Ulster, for three years, at 8*d.* daily pay.

But scarcely had the lands been allotted to the different patentees, when considerable portions were reclaimed by the clergy as their rightful property. And so far had the estates of the northern bishops been embarrassed, both by the usurpations of the Irish lords, and the claims of patentees, that they scarcely afforded a competent, much less an honourable provision for men of worth and learning, while the state of the parochial clergy was still more deplorable. Most of the northern churches had been either destroyed in the late wars, or fallen to ruin; the benefices were small, and either shamefully kept by the bishops in the way of commendam or sequestration; or filled with ministers as scandalous as their income. The wretched flock was totally abandoned; and for many years Divine Service had not been used in any parish-church of Ulster, except in cities and great towns. To remedy these abuses, and to make some proper provision for the instruction of a people immersed in lamentable ignorance, the king ordained, that all ecclesiastical lands should be restored to their respective sees and churches, and that all lands should be deemed ecclesiastical from which bishops had in former times received rents or pensions: that compositions should be made with the patentees for the site of cathedral churches, the residences of bishops and dignitaries, and other church-

lands which were not intended to be conveyed to them; who were to receive equivalents if they compounded freely; or else to be deprived of their patents as the king was deceived in his grant, and the possessions restored to the church. To provide for the inferior clergy, the bishops were obliged to resign all their impropriations, and relinquish the tithes paid them out of parishes, to the respective incumbents; for which ample recompence was made out of the king's lands. Every proportion allotted to undertakers was made a parish, with a parochial church to each. The incumbents, besides their tithes and duties, had glebe-lands assigned to them of 60, 90, or 120 acres, according to the extent of their parishes. To provide for a succession of worthy pastors, free-schools were endowed in the principal towns, and considerable grants of lands conferred on the university of Dublin, which had been re-established by queen Elizabeth, together with the advowson of six parochial churches, three of the largest, and three of the middle proportion in each county.

Such was the general scheme of this famous northern plantation, so honourable to the king, and of such consequence to the realm of Ireland. Its happy effects were immediately perceived, although the execution by no means corresponded with the original idea. Buildings were slowly erected; British tenants were difficult to be procured in sufficient numbers; the old natives were at hand, offered higher rents, and were received into those districts from which it was intended to exclude them. In this particular, the Londoners were accused of being notoriously delinquent. They acted entirely by agents; their agents were interested and indolent, and therefore readily countenanced this dangerous intrusion of the natives; an error of which sufficient cause was afterwards found to repent. For the present, however, a number of loyal and industrious inhabitants was poured into the northern counties, considerable improvements made by the planters, and many towns erected. To encourage their industry, and advance his own project, the king was pleased to incorporate several of these towns, so that they had a right of representation in the Irish parliament.

The only disturbance that now ensued was from the Popish party, who never could bear to see the Protestant religion established in preference to their own, while they had power to resist. After numberless ineffectual machinations and complaints, their fury broke out in a terrible massacre of the new English settlers in the year 1641*. The affairs of Britain were at that time in such confusion, that the rebellion could not be quelled in less than ten years; during which time the country was reduced to a most deplorable situation. It recovered again under Cromwell, Charles II. and the short reign of James II. On the accession of William III. matters were once more thrown into confusion by an attempt made in favour of the exiled monarch, who came over thither in person, and whose bad success is related under the article *BRITAIN*, n° 309.—325. Since that time, Ireland hath recovered from the miserable situation to which it was so long reduced. As yet, however, it is far from being in such a flourishing state as either South or North Britain. The great obstacle to the improvement of

49
State of Ireland since that time.

* See *Britain*, n° 103, —106.

⁴⁶ the kingdom is the extreme poverty and oppression of the common people. The produce of the kingdom, either in corn or cattle, is not above two thirds at most of what by good cultivation it might yield. The high roads throughout the southern and western parts are lined with beggars, who live in huts or cabbins without chimnies, or any covering capable of defending the wretched inhabitants from the cold, wind, and rain. "It is a scandal (says a judicious traveller, who lately visited Ireland,) to the proprietors of this fertile country, that there is not the greatest plenty of good corn and hay in it; but some of the best land in the king's dominions is suffered to be torn in pieces, and cultivated in the vilest manner, by a set of abject miserable occupiers; who are absolutely no better than slaves to the despicable, lazy, and oppressive subordinate landlords."

⁵⁰ Climate, &c. of Ire-
land. Ireland enjoys a peculiar blessing in not producing or nourishing any venomous creature. Mr O'Halloran says, that even frogs were never known to live there before the reign of William III. Indeed, it is not improbable but the breed of them might have come from France in the suite of James II.

The climate of Ireland would almost perfectly agree with that of England, were the soil equally improved, being abundantly fruitful both in corn and grafs, especially the latter; in consequence of which, an infinite number of black cattle and sheep are bred, particularly in the province of Connaught. Few countries produce finer grain than that which grows in the improved parts of this kingdom. The northern and eastern counties are best cultivated and inclosed, and the most populous.

Ireland is known to have many rich mines; and there is no inconsiderable prospect of gold and silver in some parts of the kingdom. No country in the world abounds more in beautiful lakes, both fresh and salt-water ones; and it is also plentifully watered with many beautiful rivers. The commodities which Ireland exports, as far as her present trade will permit, are hides, tallow, beef, butter, cheese, honey, wax, hemp, metals, and fish: wool and glass were, till December 23, 1779, prohibited; but her linen trade is of late grown of very great consequence. England, in the whole, is thought to gain yearly by Ireland upwards of 1,400,000l. and in many other respects she must be of very great advantage to that kingdom. Formerly, indeed, she was rather a burden to her elder sister, than any benefit; but the times are changed now, and improve every day.

⁵¹ Linen manufacture early introduced. Mr O'Halloran says, the linen manufacture was carried on in Ireland in very early days, to a great extent; and Gratianus Lucius quotes a description of the kingdom, printed at Leyden in 1627, in which the author tells us, "That this country abounds with flax, which is sent ready spun in large quantities to foreign nations. Formerly, (says he,) they wove great quantities of linen, which was mostly consumed at home, the natives requiring above 30 yards of linen in a shirt or shift." So truly expensive was the Irish fashion of making up shirts, on account of the number of plaits and folds, that, in the reign of Henry VIII. a statute passed, by which they were forbidden, under a severe penalty, to put more than seven yards of linen in a shirt or shift.

We may form some idea of what the trade of Ireland must have been in former times, when, so late as the reign of Brien Boru, who died in 1014, notwithstanding the ravages and distresses which a Danish war, of above 200 years continuance, must have produced throughout the kingdom, the annual duties arising from goods imported into the single port of Limerick, and paid in red wine, amounted to 365 pipes! Even so lately as the last century, it is scarcely credible what riches this city derived from the bare manufacture of shoes, which were exported in amazing quantities; whereas now, instead of shoes and boots, we see the raw hides shipped off for foreign markets.

No country in the world seems better situated for a maritime power than Ireland, where the ports are convenient to every nation in Europe, and the havens safe and commodious. The great plenty of timber, the superior excellence of the oak, and the acknowledged skill of her ancient artisans, in wood-works, are circumstances clearly in her favour. That the Irish formerly exported large quantities of timber, is manifest from the churches of Gloucester, Westminster-monastery and palace, &c. being covered with Irish oak.

⁵² Government, population, &c. The government of the kingdom is in the hands of a viceroy, or lord-lieutenant, who lives in very great splendour. In his absence there are lords-justices, (styled their *excellencies*) generally three in number, viz. lord-primate, lord high chancellor, and the speaker of the house of commons. The parliament of Ireland meet every other Winter, or oftener, according to exigencies. Their only power consists in proposing bills, which are subject to the privy-council of England, and in a negative voice to any amendments. As to civil magistrates and the distribution of justice, they are here on the same footing as in England.

Ireland is divided into four large provinces, and those again into 32 counties, as follows:

I. U L S T E R.

Counties.	House.	Extent, &c.
1. Antrim	20738	Length 68 } miles { 460cir-
2. Armagh	13125	Breadth 98 } cumfer.
3. Cavan	9268	Irish plantations.
4. Down	26090	Acres 2836837
5. Donnegal	12357	Parishes, 365
6. Fermanagh	5674	Boroughs, 29
7. Londonderry	14528	Baronies, 55
8. Monaghan	26637	Archbishopric, 1
9. Tyrone	16545	Bishoprics, 6
		Market-towns, 58

II. L E I N S T E R.

1. Caterlogh, or Carlow	Leng. 104 } miles { 360cir- 5444 Bread. 55 } cumf.
2. Dublin	24145 l. acr. 2642958, or 4281155
3. Kildare	8887 Parishes, 858 [English
4. Kilkenny	3231 Boroughs, 53
5. King's-county	9294 Baronies, 99
6. Longford	6057 Market-towns, 63
7. Lowth	8150 Archbishopric, 1
8. Meath (East)	14000 Bishoprics, 3
9. Queen's-county	The rivers are, the Boyne, Barrow, Liffy, Noir, and the May.
10. Westmeath	9621
11. Wexford	13015
12. Wicklow	7781

III. MUNSTER.

Counties.	Houses.	Extent, &c.
1. Clare	11381 Leng. 1007	} 660cir- miles { cumfer.
2. Cork	47334 Bread. 107	
3. Kerry	11653 Acres 3289932,	5329146,
4. Limerick	19380 Parishes, 740	[English]
5. Tipperary	18325 Boroughs, 26	
6. Waterford	9485 Baronies, 63	
	Houses, 117197	
	Archbishops, 1	
	Bishops, 6	

IV. CONNAUGHT.

1. Galway	15576 Length 90	} 500cir- miles { cumfer.
2. Leitrim	5156 Acres 2272915,	
	Parishes, 330	3681746,
3. Mayo	15089 Boroughs, 10	[English]
	Baronies, 43	
4. Roscommon	8780 Archbishops, 1	
	Bishop, 1	
5. Sligo	5970 Houses, 49666	
	Rivers are the Shannon,	
	May, Suck, and Gyll.	

In 1731, while the duke of Dorset was lord-lieutenant, the inhabitants were numbered, and it was found that the four provinces contained as follows :

Connaught	21604	} Protestants { Papists
Leinster	203087	
Munster	115130	
Ulster	360632	
	700453	

There are 44 charter working-schools at present in Ireland, wherein 2025 boys and girls are maintained and educated. These schools are maintained by an annual bounty of 1000l. by a tax upon hawkers and pedlars, and by subscriptions and legacies. The children admitted, are those born of Popish parents, or such as would be bred Papists if neglected, and are of sound limbs. Their age must be from six to ten; the boys at 16, and the girls at 14, are apprenticed into Protestant families. The first school was opened in 1734. Five pounds are given to every person educated in these schools, upon his or her marrying a Protestant. An English act of parliament, lately tolerated the Catholic religion in Ireland, and by that means has relieved thousands of useful subjects.

The return of houses in Ireland for the year 1754, was 395,439; and for the year 1766, it was 424,046. Supposing therefore the numbers to have increased at the same rate, the number of houses now cannot be less than 454,130; which, allowing five persons to a family, will make the number of inhabitants 2,260,650: but as the return of houses by hearth-collectors is rather under than above the truth, and as there are many families in every parish, who are by law excused from that tax, and therefore not returned, the number on a moderate estimate will be 2,500,000. Sir W. Petty reckoned 160,000 cabins without a chimney; and if there be an equal number of such houses now, the number of people will be above 3,000,000. Mr Molyneux says, "Ireland has certainly been better inhabited for-

merly; for on the wild mountains between Ardmach and Dundalk, are observable the marks of the plough, as they are also on the mountains of Altmore. The same has been observed in the counties of Londonderry and Donnegal. Mountains that are now covered with bogs have been formerly ploughed; for when you dig five or six feet deep, you discover a proper soil for vegetation, and find it ploughed into ridges and furrows: a plough was found in a very dead bog near Donnegal; and an hedge, with some wattles, standing under a bog that was five or six feet in depth. The stump of a large tree was found in a bog ten feet deep at Castle-Forbes; the trunk had been burnt, and some of the cinders and ashes still were lying on the stump. Mr Molyneux further says, that on the top of an high mountain, in the north, there were then remaining the streets and other marks of a large town.

Beauty seems to be more diffused in England, among the lower ranks of life, than in Ireland; which may, however, be attributed to the mere modes of living. In England, the meanest cottager is better fed, better lodged, and better dressed, than the most opulent farmers here, who, unaccustomed to what our peasants reckon the comforts of life, know no luxury but in deep potatoes of aquavite.

From this circumstance, we may account for a fact reported by the officers of the army here. They say, that the young fellows of Ireland, who offer to enlist, are more generally below the given height, than in England. There can be no appeal from their testimony; for they were Irish, and the standard is an infallible test. No reason, indeed, can be given why the causes which promote or prevent the growth of other animals, should not have similar effects upon the human species. In England, where there is no stint of provisions, the growth is not checked; but, on the contrary, it is extended to the utmost bound of nature's original intention: whereas, in Ireland, where food is neither in the same quantity nor of the same quality, the body cannot expand itself, but is dwarfed and stunted in its dimensions. The gentlemen of Ireland are full as tall as those of England; the difference then, between them and the commonality, can only proceed from the difference of food.

The inhabitants, in general, of this kingdom, are very far from what they have too often and unjustly been represented by those of our country who never saw them, a nation of wild Irish. Miserable and oppressed, as by far too many of them are, an Englishman will find as much civility in general, as amongst the same class in his own country; and, for a small pecuniary consideration, they will exert themselves to please you as much as any people, perhaps, in the king's dominions. Poverty and oppression will naturally make mankind sour, rude, and unfociable, and eradicate, or at least suppress, all the more amiable principles and passions of humanity. But it should seem unfair and ungenerous to judge of, or decide against, the natural disposition of a man reduced by indigence and oppression almost to desperation. Let commerce, agriculture, and arts, but call forth the dormant activity of their genius, and rouse the native spirit of enterprise, which now lies torpid within them; let liberal laws unsettle their minds, and plenty cheer their tables, they will soon shew themselves deservng to rank

53
Appear-
ance and
character of
the inhabi-
tants.

The bogs wherewith Ireland is in some places overgrown, are not injurious to health, as is commonly imagined; the watery exhalations from these are neither so abundant, nor so noxious, as those from marshes, which become prejudicial from the various animal and vegetable substances which are left to putrify as soon as the waters are exhaled by the sun. Bogs are not, as one might suppose from their blackness, masses of putrefaction; but on the contrary, they are of such a texture, as to resist putrefaction above any other substance we know of. A shoe, all of one piece of leather, very neatly stitched, was taken out of a bog some years ago, yet entirely fresh;—from the very fashion of which, there is scarce room to doubt, that it had lain there some centuries. Butter, called *rouskin*, hath been found in hollowed trunks of trees, where it had been hid so long, that it was become hard and almost friable, yet not devoid of usefulness; that the length of time it had been buried was very great, we learn from the depth of the bog, which was ten feet, that had grown over it. But the common phenomenon of timber-trees dug out of these bogs, not only found, but also embalmed as afterwards to defy the injuries of time, demonstrate the antiseptic quality of them.

The horns of the moose-deer must have lain many centuries in a bog; for the Irish histories do not recognize the existence of the animal whereon they grew. Indeed, human bodies have, in many places, been dug up entire, which must have lain there for ages.

The growth of bogs, however, is variable in different places, from the variety of conditions in the situation, soil, humidity, and quantity of vegetable food; in some places it is very rapid, in others very slow; and therefore their altitudes cannot afford any certain measure of time.

In the manufacturing counties of the north, peat-fuel has become so scarce, that turbaries lett from five to eight guineas an acre. In some places they are so eradicated, there does not remain a trace of them, the ground being now converted into rich meadows and sweet pastures.

If we trust to authorities, we must conclude that Ireland was not originally inferior to England, either in the fertility of the soil, or salubrity of the climate. When this country shall have felt the happy effects of the late indulgences of the British parliament, by repealing several acts which restrained the trade of this kingdom with foreign ports, and allowing the exportation of woollen manufactures and glass, and shall have received further indulgences from the same authority; and when the spirit of industry shall be infused, in consequence of it, into the common people; their country will not be inferior to any other on the globe, under the same parallel. It is very difficult to say, whether foreign or domestic causes have operated most powerfully in laying waste this fruitful country; which, by being relieved from their late unnatural prohibitions, will be enabled to furnish a grand proportion of supplies to Great Britain, and will unavoidably become of vast importance by its reciprocal trade, in restraining the increase of that of France, who cannot carry on this important branch of traffic without the assistance of Irish wool. The wool of France is

short and coarse, being, in the language of the manufacturers, neither fine in the thread nor long in the staple. This obliges them to have recourse to the wool of Ireland, which possesses both these qualities. Assisted by a pack of Irish wool, the French are enabled to manufacture two of their own; which they will no longer be able to procure, as the Irish will now work up their own wool, which they used to export; great part of which found its way to France, and enabled them to supply other markets to the great prejudice of Britain. The happy effects of it have been already felt; for, notwithstanding it was so late as December 23. 1779, that the royal assent was given to the taking off their restraints on woollen exports, it appears, that on January 10, following, an export-entry was made at the custom-house of Dublin, of 1300 yards of serge for a foreign market, by William Worthington, Esq.

IRENÆUS (St.), bishop of Lyons, was born in Greece about the year 120. He was the disciple of Pappias and St Polycarp, by whom, it is said, he was sent into Gaul in 157. He stopped at Lyons, where he performed the office of a priest; and in 178 was sent to Rome, where he disputed with Valentinius, and his two disciples Florinus and Blastus. At his return to Lyons, he succeeded Photinus, bishop of that city; and suffered martyrdom in 202, under the reign of Severus. He wrote many works in Greek, of which there only remains a barbarous Latin version of his five books against heretics, some Greek fragments in different authors, and pope Victor's letter mentioned by Eusebius. The best editions of his works are those of Erasmus, in 1526; of Grabe, in 1702; and of Father Massuet, in 1710. St Irenæus's style is close, clear, and strong, but plain and simple. Dodwell has composed six curious dissertations on the works of St Irenæus.

He ought not to be confounded with St Irenæus the deacon, who in 275 suffered martyrdom in Tuscany, under the reign of Aurelian; nor with St Irenæus, bishop of Sirmich, who suffered martyrdom on the 25th of March 304, during the persecution of Dioclesian and Maximianus.

IRENE, empress of the east, celebrated for her valour, wit, and beauty; but detestable for her cruelty, having sacrificed her own soul to the ambition of reigning alone. She died in 803.

IRIS, the RAINBOW. See RAINBOW.

IRIS, in anatomy. See there, n^o 406, m.

IRIS, the *Flower de Luce*, or Flag-flower, &c. in botany, a genus of the monogynia order, belonging to the hexandria class of plants.

There are 21 species, all herbaceous flowering perennials, both of the fibrous, tuberous, and bulbous rooted kind, producing thick annual stalks from 3 or 4 inches to a yard high, terminated by large hexapetalous flowers, having three of the petals reflexed quite back and three erect; most of which are very ornamental, appearing in May, June, and July.

Culture. All the species are easily propagated by offsets from the roots, which should be planted in September, October, or November, though almost any time from September to March will do. They may also be raised from seed, which is the best method for procuring varieties. It is to be sown in autumn, soon after it ripens, in a bed or border of common earth,

Iron
Iroquois.

earth, and raked in. The plants will rise in the spring, and are to be transplanted next autumn.

Properties. The roots of the Florentine white iris, when dry, are supposed to have a pectoral virtue. They have an agreeable smell, resembling that of violets; and hence are used in perfumes, and in flavouring of liquors. When recent, they have a bitter, acrid, nauseous taste; and when taken into the body, prove strongly cathartic; on which account they have been recommended in dropfies, in the dose of three or four scruples.—The juice of the species called *bastard acorus*, or *yellow flag-flower*, is also very acrid, and hath been found to produce plentiful evacuations from the bowels when other means had failed. For this purpose, it may be given in doses of 80 drops every hour or two; but the degree of its acrimony is so uncertain, that it can hardly ever come into general use. The fresh roots have been mixed with the food of swine bitten by a mad-dog, and they escaped the disease, when others, bitten by the same dog, died raving mad. Goats eat the leaves when fresh; but cows, horses, and swine, refuse them. Cows will eat them when dry. The roots are used in the island of Jura for dying black.

IRON, a metal of a white, livid, greyish colour; extremely hard; and, next to platinum, the most difficult to be fused. See METAL; METALLURGY; and CHEMISTRY, n° 145, 202, 242, 279, 382. See also COLOUR-Making, n° 13, 32; and DYEING, n° 17.

From some observations made by Mr King on a petrification found on the coast of East Lothian in Scotland, he hath concluded, that iron greatly promotes petrification*. He hath likewise observed, that solutions of iron may be of considerable efficacy in preventing the destruction of stones by the sun and air. See the articles STONE, PETRIFICATION; also ROCK, MARBLE, MOUNTAIN, &c.

IRON-Sick, in the sea-language, is said of a ship or boat, when her bolts or nails are so eaten with rust, and so worn away, that they occasion hollows in the planks, whereby the vessel is rendered leaky.

IRON-Wood, in botany. See the article SIDEROXylum.

IRON-Work, in botany. See the article SIDERITIS.

IRONY, in rhetoric, is when a person speaks contrary to his thoughts, in order to add force to his discourse; whence Quintilian calls it *diverſiflouiūm*.

Thus, when a notorious villain is scornfully complimented with the titles of a very honest and excellent person; the character of the person commended, the air of contempt that appears in the speaker, and the exorbitancy of the commendations, sufficiently discover the dissimulation of irony.

Ironical exhortation is a very agreeable kind of trope; which, after having set the inconveniences of a thing in the clearest light, concludes with a feigned encouragement to pursue it. Such is that of Horace, when, having beautifully described the noise and tumults of Rome, he adds ironically,

“Go now, and study tuneful verse at Rome!”

IROQUOIS, the name of five nations in North America, in alliance with the British colonies. They are bounded by Canada on the north, by the British plantations of New York and Pensilvania on the east and south, and by the lake Ontario on the west.

IRRADIATION, the act of emitting subtle effluvia, like the rays of the sun, every way. See EFFLUVIA.

IRREGULAR, something that deviates from the common forms or rules: thus, we say an irregular fortification, an irregular building, an irregular figure, &c. See the articles FORTIFICATION, &c.

IRREGULAR, in grammar, such inflections of words as vary from the general rules; thus we say, irregular nouns, irregular verbs, &c.

The distinction of irregular nouns, according to Mr Ruddiman, is into three kinds, viz. variable, defective, and abundant; and that of irregular verbs into anomalous, defective, and abundant.

IRROMANGO, or ERRAMONGO, one of the new Hebrides islands, is about 24 or 25 leagues in circuit; the middle of it lies in E. Long. 169. 19. S. Lat. 18. 54. The inhabitants are of the middle size, and have a good shape and tolerable features. Their colour is very dark; and they paint their faces, some with black, and others with red pigment: their hair is curly and crisp, and somewhat woolly. Few women were seen; and those very ugly: they wore a petticoat made of the leaves of some plant. The men were quite naked, excepting a belt tied about the waist, and a piece of cloth, or a leaf, used for a wrapper. No canoes were seen in any part of the island. They live in houses covered with thatch; and their plantations are laid out by line, and fenced round. An unlucky scuffle between the British sailors and these people, in which four of the latter were desperately wounded, prevented captain Cook from being able to give any particular information concerning the produce, &c. of this island.

IRTIS, a large river of Asia, in Siberia, which rises among the hills of the country of the Kalmucks, and, running north-east, falls into the Ob by near Tobolsk. It abounds with fish, particularly sturgeon, and delicate salmon.

IRVIN, a sea-port town of Scotland, in the bailiwick of Cunningham; seated at the mouth of a river of the same name on the Frith of Clyde; in W. Long. 2. 55. N. Lat. 55. 36.

ISAAC, the Jewish patriarch, and example of filial obedience, died 1716, B. C. aged 180.

ISAAH, the first of the four greater prophets, was the son of Amos; and was of royal blood, his father being brother to Azariah king of Juda. He prophesied under the reigns of Uzziah, Jotham, Ahaz, and Hezekiah, from the 785th to the 681st year before the Christian æra; when king Manasseh caused him to be put to death in a very advanced age. His prophecies are in Hebrew; his style is noble, sublime, and florid: he speaks so clearly of Christ, and of the great circumstances of his life and death, that he appears to be rather an evangelist and an historian who relates what has already happened, than a man who foretels what was not to be accomplished till several ages were passed.

ISÆUS, a Greek orator, born at Colchis, in Syria, was the disciple of Lyfias, and the master of Demosthenes; and taught eloquence at Athens, about 344 years B. C. Sixty-four orations are attributed to him; but he composed no more than 50, of which only 10 are now remaining. He took Lyfias for his model, and so well imitated his style and elegance, that.

Irradiation
Iffus.

Phil. Trans.
LXIX. 35.
1 seq.

that we might easily confound the one with the other, were it not for the figures which Iſæus firſt introduced into frequent uſe. He was alſo the firſt who applied eloquence to politics, in which he was followed by his diſciple Demoiſthenes.

He ought not to be confounded with Iſæus, another celebrated orator, who lived at Rome in the time of Pliny the Younger, about the year 97.

ISATIS, woad; a genus of the ſiliqueoſa order, belonging to the tetradynamia claſs, of plants. There are four ſpecies; but the only one worthy of notice is the tinctoria, or common woad, which is cultivated in ſeveral parts of Britain for the purpoſes of dyeing; being uſed as a foundation for many of the dark colours. See *COLOUR-Making*, n° 37; and *WOAD*.

The plant is biennial; the lower leaves are of an oblong oval figure, and pretty thick conſiſtence, ending in obtuſe roundiſh points; they are entire on their edges, and of a lucid green. The ſtalks riſe four feet high, dividing into ſeveral branches, garniſhed with arrow-shaped leaves fitting cloſe to the ſtalks; the branches are terminated by ſmall yellow flowers, in very cloſe cluſters, which are compoſed of four ſmall petals, placed in form of a croſs, which are ſucceeded by pods ſhaped like a bird's tongue, which, when ripe, turn black, and open with two valves, having one cell, in which is ſituated a ſingle ſeed.

This ſort is ſown upon freſh land which is in good heart, for which the cultivators of woad pay a large rent. They generally chooſe to have their lands ſituated near great towns, where there is plenty of dreſſing; but they never ſtay long on the ſame ſpot: for the beſt ground will not admit of being ſown with woad more than twice; and if it is often repeated, the crop ſeldom pays the charges of culture, &c. Thoſe who cultivate this commodity have gangs of people who have been bred to the employment; ſo that whole families travel about from place to place, wherever their principal fixes on land for the purpoſe. As the goodneſs of woad conſiſts in the ſize and fatneſs or thickneſs of the leaves, the only method to obtain this, is by ſowing the ſeed upon ground at a proper ſeaſon, and allowing the plants proper room to grow; as alſo to keep them clean from weeds, which, if permitted to grow, will rob the plants of their nourishment. After having made choice of a proper ſpot of land, which ſhould not be too light and ſandy, nor over ſtiff and moiſt, but rather a gentle hazel loam, whoſe parts will eaſily ſeparate, the next is to plough this up juſt before winter, laying it in narrow high ridges, that the froſt may penetrate through the ridges to mellow and ſoften the clods; then in the ſpring plough it again croſſwiſe, laying it again in narrow ridges. After it has lain for ſome time in this manner, and the weeds begin to grow, it ſhould be well harrowed to deſtroy them: this ſhould be repeated twice while the weeds are young; and, if there are any roots of large perennial weeds, they muſt be harrowed out, and carried off the ground. In June the ground ſhould be a third time ploughed, when the furrows ſhould be narrow, and the ground ſtirred as deep as the plough will go, that the parts may be as well ſeparated as poſſible; and when the weeds appear again, the ground ſhould be well harrowed to deſtroy them. Toward the end of July, or the beginning of Auguſt, it ſhould

be ploughed the laſt time, when the land ſhould be laid ſmooth; and when there is a proſpect of ſhowers, the ground muſt be harrowed to receive the ſeeds, which ſhould be ſown in rows with the drill-plough, or in broad-caſt after the common method; but it will be proper to ſleep the ſeeds one night in water before they are ſown, which will prepare them for vegetation: if the ſeeds are ſown in drills, they will be covered with an inſtrument fixed to the plough for that purpoſe, but thoſe which are ſown broad-caſt in the common way muſt be well harrowed in. If the ſeeds are good, and the ſeaſon favourable, the plants will appear in a fortnight, and in a month or five weeks will be fit to hoe; for the ſooner this is performed when the plants are diſtinguiſhable, the better they will thrive, and the weeds being then young will be ſoon deſtroyed. The method of hoeing theſe plants is the ſame as for turneps: with this difference only, that theſe plants need not be thinned ſo much; for at the firſt hoeing, if they are ſeparated to the diſtance of four inches, and at the laſt to ſix inches, it will be ſpace enough for the growth of the plants; and if this is carefully performed, and in dry weather, moſt of the weeds will be deſtroyed: but as ſome of them may eſcape in this operation, and young weeds will riſe, ſo the ground ſhould be a ſecond time hoed in the beginning of October, always chooſing a dry time for this work; at this ſecond operation, the plants ſhould be ſingled out to the diſtance they are to remain. After this, if carefully performed, the ground will be clean from weeds till the ſpring, when young weeds will come up: therefore about the middle of March will be a good time to hoe the ground again; for while the weeds are young, it may be performed in leſs than half the time it would require if the weeds were permitted to grow large, and the ſun and wind will much ſooner kill them: this hoeing will alſo ſtir the ſurface of the ground, and greatly promote the growth of the plants; if this is performed in dry weather, the ground will be clean till the firſt crop of woad is gathered, after which it muſt be again well cleaned; if this is carefully repeated after the gathering each crop, the land will always lie clean, and the plants will thrive the better. The expence of the firſt hoeing will be about ſix ſhillings per acre, and for the after hoeings half that price will be ſufficient, provided they are performed when the weeds are young, for if they are ſuffered to grow large, it will require more labour, nor can it be ſo well performed.

If the land, in which this ſeed is ſown, ſhould have been in culture before for other crops, ſo not in good heart, it will require dreſſing before it is ſown, in which caſe rotten ſtable-dung is preferable to any other; but this ſhould not be laid on till the laſt ploughing, juſt before the ſeeds are ſown, and not ſpread till the land is ploughed, that the ſun may not exhale the goodneſs of it, which in ſummer is ſoon loſt when ſpread on the ground. The quantity ſhould not be leſs than 20 loads to each acre, which will keep the ground in heart till the crop of woad is ſpent.

The time for gathering of the crop is according to the ſeaſon: but it ſhould be performed as ſoon as the leaves are fully grown, while they are perfectly green; for when they begin to change pale, great part of their goodneſs is over, for the quantity will be leſs, and

and the quality greatly diminished.

If the land is good, and the crop well husbanded, it will produce three or four gatherings; but the two first are the best. These are commonly mixed together in the manufacturing of it: but the after crops are always kept separate; for if these are mixed with the other, the whole will be of little value. The two first crops will sell from 25 to 30 l. a ton; but the latter will not bring more than 7 or 8 l. and sometimes not so much. An acre of land will produce a ton of wood, and in good seasons near a ton and an half.

When the planters intend to save the seeds, they cut three crops of the leaves, and then let the plants stand till the next year for seed; but if only one crop is cut, and that only of the outer leaves, letting all the middle leaves stand to nourish the stalks, the plants will grow stronger, and produce a much greater quantity of seeds.

These feeds are often kept two years, but it is always best to sow new seeds when they can be obtained. The feeds ripen in August; and when the pods turn to a dark colour, the feeds should be gathered. It is best done by reaping the stalks in the same manner as wheat, spreading the stalks in rows upon the ground: and in four or five days the feeds will be fit to thresh out, provided the weather is dry; for if it lies long, the pods will open and let out the feeds.

There are some of the woad planters, who feed down the leaves in winter with sheep; which is a very bad method: for all plants which are to remain for a future crop, should never be eaten by cattle, for that greatly weakens the plants; therefore those who eat down their wheat in winter with sheep are equally blameable.

ISATIS, in zoology, a synonyme of the *Lagopus*. See CANIS.

ISAURA, (anc. geog.), a strong city at mount Taurus, in Isauria: twice demolished: first by Perdiccas, or rather by the inhabitants, who, through despair, destroyed themselves by fire, rather than fall into the hands of the enemy; again, by Servilius, who thence took the surname *Iauricus*. Strabo says, there were two *Isaurus*, the old and the new, but so near, that other writers took them but for one.

ISAURIA, (anc. geog.) a country touching Pamphylia and Cilicia on the north, rugged and mountainous, situate almost in mount Taurus, and taking its name from *Isaura*.

ISCHIUM, in anatomy, one of the bones of the pelvis. See ANATOMY, n° 40.

ISCHURY, a disease consisting of an entire suppression of urine. See (the *Index* subjoined to) MEDICINE.

ISCLASTICS, a kind of games, or combats, celebrated in Greece and Asia, in the time of the Roman emperors.

The victor at these games had very considerable privileges conferred on him, after the example of Augustus and the Athenians, who did the like to conquerors at the olympic, pythian, and isthmian games. They were crowned on the spot immediately after their victory, had pensions allowed them, were furnished with provisions at the public cost, and were carried in triumph to their country.

ISCHIA, an Island of Italy, in the kingdom of

Naples, about 15 miles in circumference, lying on the coast of the Terra di Lavoro, from which it is three miles distant. It is full of agreeable valleys, which produce excellent fruits. It hath also mountains on which grow vines of an excellent kind: likewise fountains, rivulets, and fine gardens.

ISCHIA, a town of Italy, and capital of an island of the same name, with a bishop's see, and a strong fort. Both the city and fortrefs stand upon a rock, which is joined to the island by a strong bridge; the rock is about seven furlongs in circumference. The city is like a pyramid of houses piled upon one another, which makes a very singular and striking appearance. At the end of the bridge next the city are iron gates, which open into a subterraneous passage, through which they enter the city. They are always guarded by soldiers who are natives of the island. E. Long. 13. 55. N. Lat. 40. 50.

ISENACH, a town of Germany, in the circle of Upper Saxony, from whence one of the Saxon princes takes the title of *duke*. There are iron mines in the neighbourhood. E. Long. 9. 17. N. Lat. 51. 0.

ISENBURG, a large town of Germany, capital of a county of the same name, with a handsome castle, seated on the river Seine, in E. Long. 7. 14. N. Lat. 50. 28. The county belongs to the elector of Treves.

ISENGHEIN, a town of the Austrian Netherlands, with the title of a *principality*, seated on the river Mandera, in E. Long. 3. 18. N. Lat. 50. 44.

ISH, in Scots law, signifies *expiry*. Thus we say "the *ish* of a lease." It signifies also *to go out*; thus we say "free *ish* and entry" from and to any place.

ISIA, feasts and sacrifices anciently solemnized in honour of the goddess Isis.

The *isha* were full of abominable impurities; and for that reason, those who were initiated were obliged to take an oath of secrecy: they were held for nine days successively; but were so abominable, that the senate abolished them at Rome, under the consulship of Piso and Gabinus.

ISENARTS, or EISENARTS, a considerable town of Germany in Austria, and in Styria; famous for its iron mines. E. Long. 15. 25. N. Lat. 46. 56.

ISERNIA, a town of Italy, in the kingdom of Naples, and in the county of Molise, with a bishop's see. It is seated at the foot of the Appenines, in E. Long. 14. 20.

ISIDORUS, called DAMIATENSIS, or PELUSIOTAS, from his living in a solitude near that city, was one of the most famous of all St Chrysostom's disciples, and flourished in the time of the general council held in 421. We have 2012 of his epistles in five books. They are short, but well written in Greek. The best edition is that of Paris, in Greek and Latin, printed in 1638, in folio.

ISIGNI, a town of France, in Lower Normandy, with a small harbour, and well known on account of its salt-works, its cyder, and its butter. W. Long. 0. 50. N. Lat. 49. 20.

ISIS, an Egyptian goddess, whose worship was so infamous, that the priests were forbid to speak any thing of it; and the senate did often prohibit its practice.

practice in Rome. She is pictured with a *sistrum* in her hand, a musical instrument not much unlike a cymbal; and was often called *Terra*, from whence she is represented as having many breasts. Some historians say she was queen of Egypt, and reigned there with her husband Osiris, A. M. 2500.

ISINGLASS. See ICHTHYOCOLLA.

ISLAND, a tract of dry land encompassed with water; in which sense it stands contradicting with the word CONTINENT, or TERRA FIRMA.

Several naturalists are of opinion, that the islands were formed at the deluge; others think, that there have been new islands formed by the casting up of vast heaps of clay, mud, sand, &c.; others think they have been separated from the continent by violent storms, inundations, and earthquakes. These last have observed, that the East-Indies, which abound in islands more than any other part of the world, are likewise more annoyed with earthquakes, tempests, lightnings, volcanos, &c. than any other part. Others again conclude, that islands are as ancient as the world, and that there were some at the beginning; and, among other arguments, support their opinion from Gen. x. 5. and other passages of Scripture.

Varenius thinks that there have been islands produced each of these ways. St Helena, Ascension, and other steep rocky islands, he supposes to have become so by the sea's overflowing their neighbouring champaigns: but by the heaping up huge quantities of sand, and other terrestrial matter, he thinks the islands of Zealand, Japan, &c. were formed. Sumatra and Ceylon, and most of the East-India islands, he thinks, were rent off from the main land; and concludes, that the islands of the Archipelago were formed in the same way, imagining it probable that Deucalion's flood might contribute towards it. The ancients had a notion that Delos, and a few other islands, rose from the bottom of the sea; which, how fabulous soever it may appear, agrees with later observations. Seneca takes notice, that the island Therasia rose thus out of the Ægean sea in his time, of which the mariners were eye-witnesses.

It is indeed very probable, that many islands have existed not only from the deluge, but from the creation of the world; and we have undoubted proofs of the formation of islands in all the different ways above-mentioned. Another way, however, in which islands are frequently formed in the South Sea, is by the coralline insects: (See CORALLINA.) On this subject the following curious dissertation by Alexander Dalrymple, Esq; hath appeared in the Philosophical Transactions for the year 1767.

"These islands are generally long and narrow: they are formed by a narrow bar of land, inclosing the sea within it; generally, perhaps always, with some ingress at least to the tide; commonly with an opening capable of receiving a canoe, and frequently sufficient to admit even larger vessels.

"The origin of these islands will explain their nature. What led me first to this deduction was an observation of Abdul Roobin, a Sooloo pilot, that all the islands lying off the north-east coast of Borneo had shoals to the eastward of them.

"These islands being covered to the westward by Borneo, the winds from that quarter do not attack

them with violence. But the north-east winds, tumbling in the billows from a wide ocean, heap up the coral with which those seas are filled. This, obvious after storms, is perhaps at all other times imperceptibly effected.

"The coral banks, raised in the same manner, become dry. These banks are found of all depths, at all distances from shore, entirely unconnected with the land, and detached from each other: although it often happens that they are divided by a narrow gut without bottom.

"Coral banks also grow, by a quick progression, towards the surface; but the winds, heaping up the coral from deeper water, chiefly accelerate the formation of these into shoals and islands. They become gradually shallower; and, when once the sea meets with resistance, the coral is quickly thrown up by the force of the waves breaking against the bank; and hence it is, that, in the open sea, there is scarce an instance of a coral bank having so little water that a large ship cannot pass over, but it is also so shallow that a boat would ground on it.

"I have seen these coral banks in all the stages; some in deep water, others with few rocks appearing above the surface; some just formed into islands, without the least appearance of vegetation; and others from such as have a few weeds on the highest part, to those which are covered with large timber, with a bottomless sea at a pistol-shot distance.

"The loose coral, rolled inward by the billows in large pieces, will ground; and the reflux being unable to carry them away, they become a bar to coagulate the sand, always found intermixed with coral; which sand, being easily raised, will be lodged at top. When the sand-bank is raised by violent storms beyond the reach of common waves, it becomes a resting-place to vagrant birds, whom the search of prey draws thither. The dung, feathers, &c. increase the soil, and prepare it for the reception of accidental roots, branches, and seed, cast up by the waves, or brought thither by birds. Thus islands are formed: the leaves and rotten branches intermixing with the sand, form in time a light black mould, of which in general these islands consist; more sandy as less woody; and, when full of large trees, with a greater proportion of mould.

"Cocoa nuts, continuing long in the sea without losing their vegetative powers, are commonly to be found in such islands; particularly as they are adapted to all soils, whether sandy, rich, or rocky.

"The violence of the waves within the tropics, must generally be directed to two points, according to the monsoons.

"Hence the islands formed from coral banks must be long and narrow, and lie nearly in a meridional direction. For even supposing the banks to be round, as they seldom are when large, the sea, meeting most resistance in the middle, must heave up the matter in greater quantities there than towards the extremities; and, by the same rule, the ends will generally be open, or at least lowest. They will also commonly have soundings there, as the remains of the bank, not accumulated, will be under water.

"Where the coral banks are not exposed to the common monsoon, they will alter their direction; and

Island.

and be either round, extend in the parallel, or be of irregular forms, according to accidental circumstances.

"The interior parts of these islands being sea, sometimes form harbours capable of receiving vessels of some burthen, and, I believe, always abound greatly with fish; and, such as I have seen, with turtle-grais and other sea-plants, particularly one species, called by the Sooolos *gammye*, which grows in little globules, and is somewhat pungent, as well as acid, to the taste.

"It need not be repeated, that the ends of those islands only are the places to expect foundings; and they commonly have a shallow spit running out from each point.

"Abdul Roobin's observation points out another circumstance, which may be useful to navigators; by consideration of the winds to which any islands are most exposed, to form a probable conjecture which side has deepest water; and from a view which side has the shoals, an idea may be formed which winds rage with most violence."

Islands from their situation enjoy many great advantages, the principal of which are these. In the first place, many benefits are derived to the inhabitants of an island from its unity. The very largest country on a continent is still but a part, which implies dependence, and is necessarily attended with a train of imperfections; from all of which, by the unerring and unalterable laws of nature, the people who live in an island are or may be entirely free. All countries on the continent are exposed to continual dangers, against which their inhabitants must be perpetually upon their guard. This renders a large military force requisite. It involves them in continual negotiations, leagues, and alliances; all of which, however, cannot exempt them from frequent wars, or the miseries that attend them, and which have commonly bad effects on their internal policy. In the next place, the climate is generally mild and salubrious from the vapours of the surrounding sea, which according to the latitude abates the violence of heat, and moderates the rigour of cold, both which are sensibly and constantly less than on continents under the same elevation of the pole. We have a remarkable instance of this, in the islands called anciently *Stachades*, in the modern Latin *Insule Arcarum*, by us the islands of *Hieres*. They are three in number, lying in 43° north latitude, before the port of Toulon. In them, the fruits of France and Italy arrive at the highest perfection, and all the medical herbs of Italy, Greece, and Egypt, grow wild. Yet the climate is wonderfully temperate and pleasant in all seasons*.—There is also commonly a greater variety, and always a greater fertility, in the soil, occasioned chiefly by the warmth of the circumambient air, frequent showers, and, in consequence of both, being continually impregnated with vegetable salts. Another considerable advantage arises from its accessibility on every side, by which it is open to receive supplies from other countries, and has the convenience of exporting its commodities and manufactures to all markets, and, in comparison of the continent, at all seasons. The opposite sides of an island may in regard to commerce be considered as two countries; each has its ports, its proper commodities, its proper correspondencies; in con-

Island.

sequence of which, it promotes the cultivation, and procures vent for the manufactures, of a large district behind it; while the intermediate midland space finds a profit in that inland trade, which these two districts supply. The winds contrary on one side are favourable on the other; and the sea, the common road to both coasts, is continually ploughed by vessels outward and homeward bound, which keeps up that active and enterprising spirit which characterizes islanders. An island has at once the most extensive and the most effectual frontier, and this on all sides, subsisting for ever, without repairs, and without expence: and, which is still more, derives from this very frontier a great part of the subsistence of its inhabitants, and a valuable article in its commerce, from its fisheries. It is commonly said the sea is a mine, but in truth it is better; its treasures are more lasting and more certain, procured by labour solely, and fit for use or for sale as soon as procured, quickly consumed, and thereby the source of continual employment to a stout, hardy, laborious race of men, who likewise find employment for numbers, and are in various respects otherwise beneficial members of the community. The defence of this natural barrier, which, as we have said, costs nothing; but on the contrary yields much, is not only permanent, but in every respect more to be relied on than any that could be raised by the skill and industry of men at the greatest expence. All these blessings and benefits are infused by the lesson that Nature dictates, some would say the law which she prescribes, to the inhabitants of every island, to place all their hopes in the assiduous cultivation of their own country, to bend all their endeavours to raising and extending their commerce, and to put their trust in Providence, and in the safeguard which she directs; men accustomed to robust and hardy exercises, and in what necessarily arises from their way of life, a naval force. The first inhabitants come in vessels, are for a time dependent on the country from whence they came, arrive at independence by enlarging their correspondence: and thus commerce is natural and essential to the people of an island; which is the reason that they thrive so long as they possess it, and gradually decline in the same proportion in which that decays.

ISLAND of Ice. See ICE-Island.

Floating ISLANDS. Histories are full of accounts of floating islands; but the greatest part of them are either false or exaggerated. What we generally see of this kind is no more than the concretion of the lighter and more viscous matter floating on the surface of the water in lakes; and, with the roots of the plants, forming congeries of different sizes, which, not being fixed to the shore in any part, are blown about by the winds, and float on the surface. These are generally found in lakes, where they are confined from being carried too far; and, in process of time, some of them acquire a very considerable size. Seneca tells us of many of these floating islands in Italy; and some later writers have described not a few of them in other places. But, however true these accounts might have been at the time when they were written, very few proofs of their authenticity are now to be found; the floating islands having either disappeared again, or been fixed to the sides in such a manner as to make a part of the shore. Pliny tells us of a great island

* See
America,
no 6.—23

Island
 Trinic.

which at one time swam about in the lake Cutilia in the country of Reatinum, which was discovered to the old Romans by a miracle; and Pomponius tells us, that in Lydia there were several islands to loose in their foundations, that every little accident shook and removed them.

ISLAND (or *Iceland*) *Crystal*, a body famous among the writers on optics, for its property of a double refraction; but named very improperly, as it has none of the distinguishing properties of crystal, and is plainly a body of another class. Dr Hill has determined it to be a genus of spars, which he has called, from their figure, *paralleloipedia*, and of which he has described several species; all of which, as well as some other bodies of a different genus, have the same properties. It is always found in form of an oblique paralleloiped with six sides; and is found of various sizes, from a quarter of an inch to three inches or more in diameter. It is pellucid, and not much less bright than the purest crystal; and its planes are all tolerably smooth, tho', when nicely viewed, they are found to be waved with crooked lines made by the edges of imperfect plates. What appears very singular in the structure of this body is, that all the surfaces are placed in the same manner, and consequently it will split off into thin plates either horizontally or perpendicularly; but this is found, on a microscope examination, to be owing to the regularity of figure, smoothness of surface, and niceness of joining, in the small paralleloiped concretions of which the whole is composed. It is very soft, and easily scratched with the point of a pin. It will not give fire on being struck against steel; and ferments and is totally dissolved in aquafortis. It was first discovered in Iceland, from whence it has its name; but has been found in France, Germany, and many other places. In England, fragments of other spars are often mistaken for it; many of them having in some degree the same properties. For an account of the singular refractive property of this substance, see (*the Index* subjoined to) **OPTICS**.

ISLE-ADAM, a town of France, with a handsome castle, and the title of a baron; seated on the river Oise, three miles from Beaumont, and 20 from Paris. E. Long. 2. 13. N. Lat. 49. 7.

ISLE-de-Dieu, a small island of France in the sea of Gascony, and on the coast of Poitou, from which it is 14 miles. W. Long. 2. 5. N. Lat. 46. 45.

ISLE-de-France, is one of the 12 general governments of France; bounded on the north by Picardy; on the west by Normandy, on the south by the government of Orleannois, and on the east by that of Champagne. It is about 90 miles in length, and as much in breadth; and is watered by the rivers Seine, Marne, Oise, and Aisne. The air is temperate, and the soil fertile; and it abounds in wine, corn, and fruits. It contains 10 small districts, and Paris is the capital city.

ISNY, an imperial town of Germany, in Suabia, and in Algow; seated on the river Iny, in E. Long. 9. 10. N. Lat. 47. 33.

ISNIC, a town of Turkey in Asia, and in Natolia, with a Greek archbishop's see. It is the ancient Nice, famous for the first general council held here in 325. There is now nothing remaining of its ancient splendor but an aqueduct. The Jews inhabit the greatest part

of it; and it is seated in a country fertile in corn and Isochronal excellent wine. E. Long. 30. 9. N. Lat. 47. 15.

ISOCHRONAL, is applied to such vibrations of a pendulum, as are performed in the same space of time; as all the vibrations or swings of the same pendulum are, whether the arches it describes are shorter or longer.

ISOCHRONAL-Line, that in which a heavy body is supposed to descend without any acceleration.

ISOCRATES, one of the greatest orators of Greece, was born at Athens, 436 B. C. He was the son of Theodorus, who had enriched himself by making musical instruments, and gave his son a liberal education. Isocrates was the disciple of Prodicus, Gorgias, and other great orators. He endeavoured at first to declaim in public, but without success; he therefore contented himself with instructing his scholars and making private orations. He always shewed great love for his country; and being informed of the loss of the battle of Chereonea, he abstained four days from eating, and died, aged 98. There are still extant 21 of his discourses or orations, which are excellent performances, and have been translated from the Greek into Latin by Wolfius. Isocrates particularly excelled in the justness of his thoughts, and the elegance of his expressions. There are also nine letters attributed to him.

ISOLA, a town of Italy, in the kingdom of Naples, and in the Farther Calabria, with a bishop's see. It is a sea-port town, and is seated 15 miles south-east of St Severina. E. Long. 7. 33. N. Lat. 39. 1.

ISOPERIMETRICAL FIGURES, in geometry, are such as have equal perimeters or circumferences.

ISOCELES TRIANGLE, in geometry, one that has two equal sides,

ISPAHAN, or, as the Persians pronounce it, *Spau-hawn*, the capital of Persia, is situated in the province of Irac, Agemi, or Persia Proper, upon the ruins, as generally supposed, of the ancient Hecatompylos, or, as others think, of the Aspa of Ptolemy. Most of the Eastern astronomers and geographers place it in N. Lat. 32. 25. E. Long. 86. 40. It stands in a very extensive plain, surrounded by mountains; and has eight districts belonging to it, that contain about 400 towns and villages. The fertility of the soil, the mildness of the seasons, and the fine temperature of the air, all conspire to render Isphahan one of the most charming and delightful cities in the world. It is unanimously agreed, that the present city is of no great antiquity; and the two parts into which it is divided, preserve the names of two contiguous towns, from the junction of which it was formed. The inhabitants of these, notwithstanding their neighbourhood, bear an inveterate antipathy to each other; which they discover on all public occasions. Spauhawn owes the glory it now possesses to the great Shah Abas; who, after the conquest of the kingdoms of Lar and Ormus, charmed with the situation of this place, made it the capital of his empire, between the years 1620 and 1628. The mountains, with which this city is surrounded, defend it alike from the sultry heats of summer, and the piercing winds of the winter-season; and the plain on which it stands, is watered by several rivers, which contribute alike to its ornament and use. Of these rivers,

Isochronal
 Isphahan.

the.

Ispahan.

the Zenderoud, after being joined by the Mahmood, passes by Spauhawn; where it has three fine bridges over it, and is as broad as the Seine at Paris. The waters of these united streams are sweet, pleasant, and wholesome, almost beyond comparison; as, indeed, are all the springs found in the gardens belonging to the houses of Spauhawn. The extent of Spauhawn is very great; not less, perhaps, than 20 miles within the walls, which are of earth, poorly built, and so covered with houses and shaded with gardens, that in many places it is difficult to discover them. The Persians are wont to say, *Spauhawn nisfigehon*, i. e. Spauhawn is half the world. Sir John Chardin says, that tho' some reckoned 11,000,000 of inhabitants in it, he did not himself look upon it as more populous than London. At a distance, the city is not easily distinguished; for many of the streets being adorned with plantains, and every house having its garden, the whole looks like a wood. The streets in general are neither broad nor convenient; there being three great evils which attend them: the first is, that being built on common sewers, these are frequently broke up, which is very dangerous, considering that most people are on horseback; the second is, that there are many wells or pits in them, which are not less dangerous; the third arises from the people's emptying all their ordure from the tops of their houses: this last, indeed, is in some measure qualified by the dryness of the air, and by its being quickly removed by the peasants, who carry it away to dung their grounds. Some reckon eight, and others ten gates, besides posterns; but all agree that there is no difficulty of entering at any hour of the day or night. The three principal suburbs annexed to it are, Abbas-abad, built by Shah Abbas, and belonging to the people of Tauris; Julfa, inhabited by a colony of Armenians, called by some *New Julfa*, to distinguish it from the ancient city of that name, situated in Armenia, upon the Araxes, whence the original inhabitants of New Julfa were brought; and Ghebr-Abad, or, as the Arabs pronounce it, Kebr-Abad, the street of the magians, occupied entirely by the professors of magism, or the religion of the ancient Persians. The river Zenderoud separates the city of Ispahan and Abbas-Abad, from Julfa and Ghebr-Abad. This city has suffered greatly since the commencement of the dreadful rebellion in 1721; the whole kingdom from that period, till a few years ago, having been almost a continued scene of blood, ravages, and confusion. A celebrated modern traveller, who was on the spot, tells us, that the inhabitants of Julfa, not many years before the above revolution happened, amounted to 30,000 souls; had 13 churches; and above 100 priests; and paid the Persian court 200 tomans yearly for the free exercise of their religion: that some of the streets were broad and handsome, and planted with trees, with canals and fountains in the middle; others narrow and crooked, and arched a top; others again, though extremely narrow, as well as turning and winding many ways, were of an incredible length, and resembled so many labyrinths: that, at a small distance from the town, there were public walks, adorned with rows of plane-trees on each side, ways paved with stones, fountains, and cisterns: that there were above 100 caravanseras for the use of merchants and travellers, many of which were built by the kings and prime

nobility of Persia: that, as little rain fell there, the streets were frequently full of dust, which rendered the city disagreeable during a considerable part of the summer; that the citizens, however, to make this inconvenience more tolerable, used to water them when the weather was warmer than usual: that there was a castle in the eastern part of the town, which the citizens looked upon as impregnable, in which the public money, and most of the military stores, were said to be kept: that, notwithstanding the baths and caravanseras were almost innumerable, there was not one public hospital: that most of the public buildings were rather neat than magnificent, though the great meydan or market-place, the royal palace (which is three quarters of a league in circumference), and the alley denominated *Toher-bag*, adjoining to it, made a very grand appearance: that the former contained the royal mosque; the building denominated *kayserich*, where all sorts of foreign commodities were exposed to sale; and the miut, styled by the Persians *feraa khoneh*, where the current-money of the kingdom was coined: that, besides the native Persians, there were then in Ispahan above 10,000 Indians, all supported by trade; 20,000 Georgians, Circassians, and Tartars of Daghestan or Lefgees, with a considerable number of English, Dutch, Portuguese, and a few French: that the Capuchins, discalceated or bare-footed Carmelites, Jesuits, Dominicans, and Austin friars, had likewise their convents here, though they were unable to make any converts; and that there were above 100 mosques and public colleges. But since the fatal period above-mentioned, the suburb of Julfa was almost totally abandoned by the Armenians. The government of Ispahan, 23 leagues long and as many broad, comprehending several districts, most of them formerly well peopled, appeared not many years ago little better than a desert; most of the inhabitants of that fertile and delightful tract being fled and dispersed. Multitudes of them had taken a precarious refuge in the mountains of Loristan, lying between Ispahan and Sufter, whose lands were left untilld, and their houses mouldered into ruins. In short, all the distresses of an unsuccessful war, or the invasion of a barbarous enemy, could not have plunged the people of Ispahan into greater misery than the victories of their tyrannical king, Nadir Shah, who seemed more solicitous to humble his own subjects than his enemies. As this was the case before the death of that usurper, in what condition must we suppose Ispahan and the rest of Persia to be in now, as the kingdom hath been ever since, till very lately, desolated by a civil war occasioned by several competitors for the crown? Whoever desires to be more fully informed in relation to the state of the city before the troubles, may consult Sir John Chardin, Mr Tavernier, M. le Brun, and Dr Kempter, who is much later than the others.

ISPIDA, in ornithology. See ALCEDO.

ISRAEL, a name given by the Deity to the patriarch Isaac, and often used for the whole nation of the Jews.

Kingdom of ISRAEL, that of the ten tribes after their revolt from the house of David; called also the kingdom of *Ephraim* and of *Samaria*; extending both on this and on the other side of Jordan; and from Syria, thro' Galilee, to the borders of Benjamin; com-

Ispahan
of
Israel.

Issachar prising the tribes of Dan and Simeon, and the west of Judah, quite to the borders of Egypt. Issus.

ISSACHAR, one of the divisions of Palestine by tribes; lying to the south of Zabulon, so as by a narrow slip to reach the Jordan, between Zabulon and Manasseh, Josh. xix. But whether it reached to the sea, is a question; some holding that it did: an assertion not easy to be proved, as Joshua makes no mention of the sea in this tribe, nor does Josephus extend it farther than to mount Carmel; and in Josh. xvii. 10. After is said to touch Manasseh on the north, which could not be if Issachar extended to the sea.

ISSOUDUN, a considerable town of France, in Berry. It carries on a great trade in wood, cattle, cloth, hats, and stockings; is seated partly on a plain, and partly on an eminence. E. Long. 2. 5. N. Lat. 46. 57.

ISSUE, in law. See PLEA and Issue.

ISSUES, in surgery, are little ulcers made designedly by the surgeon in various parts of the body, and kept open by the patient, for the preservation and recovery of his health.

ISSUS, now AJAZO, a town of Cilicia in Natolia, with a harbour on the Levant Sea, a little to the north of Scanderoon. E. Long. 36. 25. N. Lat. 36. 56.

Near this place, in a difficult pass between the mountains and the sea, Alexander the Great fought his second battle with Darius. One great cause of the defeat which the Persians received here was the bad conduct of their monarch, who led his numerous forces into a narrow place, where they had not room to act. Alexander was so much surprised when he first received the news that Darius was behind him, that he could scarce believe it to be true: but when he was thoroughly satisfied of the fact, and that Darius had again passed the river Pinarus, he called a council of war, wherein, without asking any body's advice, he only told them, that he hoped they would remember their former actions; and that they, who were always conquerors, were about to fight people who were always beat. He further observed, that Darius seemed to be infuriated, since he had with such expedition quitted an open and champaign country, where his numbers might have acted with advantage, to fight in a place inclosed, where the Macedonian phalanx might be well drawn up, and where his numbers could only incommode him. He then made the necessary dispositions for repassing the mountains, posted guards where he found them necessary, and then commanded his troops to refresh themselves, and to take their rest till morning.

At break of day he began to repass the mountains, obliging his forces to move in close order where the road was narrow, and to extend themselves as they had more room; the right wing keeping always close to the mountain, and the left to the sea-shore. On the right there was a battalion of heavy-armed troops, besides the targeteers under the command of Nicanor the son of Parmenio. Next these, extending to the phalanx, were the corps of Cœnus and Perdicas; and on the left, the respective bodies commanded by Amyntas, Ptolemy, and Meleager. The foot appointed to support them were commanded by Craterus; but the whole left wing was committed to Parmenio, with strict orders not to decline from the sea-shore, lest the

Persians should surround them. Darius ordered 20,000 foot and 30,000 horse to retire, finding that he already wanted room to draw up the rest. His first line consisted of 30,000 Greek mercenaries, having on their right and left 60,000 heavy-armed troops, being the utmost the ground would allow. On the left, towards the mountain, he posted 20,000 men, which, from the hollow situation of the place, were brought quite behind Alexander's right wing. The rest of his troops were formed into close and useless lines behind the Greek mercenaries, to the number in all of 600,000 men. When this was done, he suddenly recalled the horse who had retired, sending part of them to take post on his right against the Macedonians commanded by Parmenio; and the rest he ordered to the left towards the mountain: but, finding them unserviceable there, he sent the greatest part of them to the right; and then took upon himself, according to the custom of the Persian kings, the command of the main body. As soon as Alexander perceived that the weight of the Persian horse was disposed against his left wing, he dispatched, with as much secrecy as he could, the Thessalian cavalry thither, and supplied their places on the right by some brigades of horse from the van, and light-armed troops. He also made such dispositions, that, notwithstanding the mighty advantage of the hollow mountain, the Persians could not surround him. But, as these precautions had considerably weakened the centre of his army, he ordered those advanced posts on the enemy's left, of which he was most apprehensive, to be attacked at the very beginning of the fight; and when they were easily driven from them, he recalled as many troops as were necessary to strengthen his centre.

When all things were in order, Alexander gave strict command, that his army should march very slowly. As for Darius, he kept his troops fixed in their posts, and in some places threw up ramparts; whence the Macedonians rightly observed, that he thought himself already a prisoner. Alexander at the head of the right wing engaged first, and without any difficulty broke and defeated the left wing of Darius. But, endeavouring to pass the river Pinarus after them, his troops in some measure losing their order, the Greek mercenaries fell upon them in flank, and made them fight, not only for victory, but for their lives. Ptolemy the son of Seleucus, and 120 Macedonians of some rank, were killed upon the spot. But the foot next to Alexander's right wing coming in seasonably to its relief, fell upon the mercenaries in flank, amongst whom a dreadful carnage was made; they being in a manner surrounded by the horse and light-armed troops, which at first pursued the left wing, and the foot that had now passed the river. The Persian horse on the right still fought gallantly; but, when they were thoroughly informed of the rout of their left wing, of the destruction of the Greek mercenaries, and that Darius himself was fled, they began to break, and betake themselves to flight also. The Thessalian cavalry pursued them close at the heels; the narrow craggy roads incommoded them exceedingly, so that vast numbers of them perished. As for Darius, he fled, soon after the left wing was broken, in a chariot with a few of his favourites: as far as the country was plain and

and open, he escaped well enough; but, when the roads became rocky and narrow, he quitted it, and, mounting an horse, rode all the night: his chariot, in which were his cloak and his bow, fell into the hands of Alexander, who carried them back to his camp.

In respect to the battle of Iffus, Diodorus informs us, that Alexander looked every-where about for Darius; and, as soon as he discovered him, with his handful of guards attacked him and the flower of the Persian army which was about him; being as desirous of obtaining this victory by his personal valour, as of subduing the Persian empire by the courage of his soldiers. But when Oxathres, the brother of Darius, saw Alexander's design, and how fiercely he fought to accomplish it, he threw himself, with the horse who were about him, between his brother's chariot and the enemy, where an oblique fight was maintained, till the dead bodies rose like an entrenchment about the chariot of Darius. Many of the Persian nobility were slain, and Alexander himself was wounded in the thigh. At last, the horses in the chariot of Darius started, and became so unruly, that the king himself was forced to take the reins; the enemy, however, pressed so hard upon him, that he was constrained to call for another chariot, and mounted it in great danger. This was the beginning of the rout, which soon after became general. According to this author, the Persians lost 300,000 foot, and 10,000 horse; the Macedonians 200,000 foot, and 150 horse.

Justin informs us, that the Persian army consisted of 400,000 foot, and 100,000 horse. He says, that the battle was hard fought, that both the kings were wounded, and that the Persians still fought gallantly when their king fled, but that they were afterwards speedily and totally routed: he is very particular as to their loss, which he says amounted to 61,000 foot, 10,000 horse, and 40,000 taken prisoners; of the Macedonians he says there fell no more than 130 foot, and 150 horse. Curtius says, that of the Persians there fell 100,000 foot, and 10,000 horse: of Alexander's army 504, he says, were wounded; 32 foot and 150 horse killed. That we may not suspect any error in transcribers, his own observation confirms the fact: *Tantulo impendio ingens victoria fletit*, "So small was the cost of so great a victory."

ISTHMA, or ISTHMIAN Games; one of the four solemn games which were celebrated every fifth year in Greece. They had their name from the Isthmus of Corinth, where they were celebrated. In their first institution, according to Pausanias, they consisted only of funeral rites and ceremonies in honour of Melicertes: but Theseus afterwards, as Plutarch informs us, in emulation of Hercules, who had appointed games at Olympia in honour of Jupiter, dedicated those to Neptune, his reputed father; who was regarded as the particular protector of the Isthmus and commerce of Corinth. The same trials of skill were exhibited here as at the other three sacred games; and particularly those of music and poetry. These games, in which the victors were only rewarded with garlands of pine-leaves, were celebrated with great magnificence and splendour as long as paganism continued to be the established religion of Greece; nor were they omitted even when Corinth was sacked and burned by Mummius the Roman general; at which

time the care of them was transferred to the Sicyonians, but was restored again to the Corinthians when their city was rebuilt.

ISTHMUS, a narrow neck, or slip of ground, which joins two continents: or joins a peninsula to the terra firma, and separates two seas. See PENINSULA.

The most celebrated isthmuses are those of Panama, or Darien, which joins North and South America; that of Suez, which connects Asia and Africa; that of Corinth, or Peloponnesus, in the Morea; that of Crim-Tartary, otherwise called *Taurica Chersonesus*; that of the peninsula Romania, and Erisso, or the isthmus of the Thracian Chersonesus, 12 furlongs broad, being that which Xerxes undertook to cut through. The ancients had several designs of cutting the isthmus of Corinth, which is a rocky hillock, about ten miles over; but they were all in vain, the invention of sluices being not then known. There have been attempts too for cutting the isthmus of Suez, to make a communication between the Red sea and the Mediterranean: but these also failed; and in one of them, a king of Egypt is said to have lost 120,000 men.

ISTRIA, a peninsula of Italy, in the territory of Venice, lying in the north part of the Adriatic sea. It is bounded by Carniola on the north; and on the south, east, and west, by the sea. The air is unwholesome, especially near the coast; but the soil produces plenty of wine, oil, and pastures; there are also quarries of fine marble. One part of it belongs to the Venetians, and the other to the house of Austria. Cabo d'Istria is the capital town.

ITALIAN, the language spoken in Italy. See the article LANGUAGE.

This tongue is derived principally from the Latin; and of all the languages formed from the Latin, there is none which carries with it more visible marks of its original than the Italian. It is accounted one of the most perfect among the modern tongues, containing words and phrases to represent all ideas, to express all sentiments, to deliver one's self on all subjects, to name all the instruments and parts of arts, &c. It is, however, complained, that it has too many diminutives and superlatives, or rather augmentatives; but without any great reason: for if these words convey nothing farther to the mind than the just ideas of things, they are no more faulty than our pleonasm and hyperboles. The language corresponds to the genius of the people: they are slow and thoughtful; and accordingly their language runs heavily, though smoothly, and many of their words are lengthened out to a great degree. They have a great taste for music; and, to gratify their passion this way, have altered abundance of their primitive words, leaving out consonants, taking in vowels, softening and lengthening out their terminations for the sake of the cadence. Hence the language is extremely musical, and succeeds better than any other in operas, and some parts of poetry; but it fails in strength and nerves: hence also a great part of its words borrowed from the Latin became so far disguised, that they are not easily known again.

ITALY, one of the finest countries of Europe, lying between 7 and 10 degrees of E. Long. and between 37 and 46 degrees of N. Lat. On the north,

north-

Italy.

north-west, and north-east, it is bounded by France, Switzerland, the country of the Grisons, and Germany; on the east, by the Adriatic sea, or gulf of Venice; and on the south and west, by the Mediterranean; its figure bearing some resemblance to that of a boot. Its length from Aosta, at the foot of the Alps in Savoy, to the utmost verge of Calabria, is about 600 miles; but its breadth is very unequal, being in some places near 400 miles, in others not above 25 or 30.

Its different names.

Italy was anciently known by the names of *Saturnia*, *Oenotria*, *Heperia*, and *Ausonia*. It was called *Saturnia* from Saturn; who, being driven out of Crete by his son Jupiter, is supposed to have taken refuge here. The names of *Oenotria* and *Ausonia*, it borrowed from its ancient inhabitants the Oenotrians and Ausones; and that of *Heperia*, or *Wesperia*, was given it by the Greeks, from its situation with respect to Greece. The name of *Italia*, or *Italy*, which, in process of time, prevailed over all the rest, is by some derived from Italus, a king of the Siculi: by others, from the Greek word *Italos*, signifying an ox; this country abounding, by reason of its rich pastures, with oxen of an extraordinary size and beauty. All these names were originally peculiar to particular provinces of Italy, but afterwards applied to the whole country.

Division in ancient times.

This country was in ancient times, like most others, divided into a great number of petty states and kingdoms. In after-times, when the Gauls settled in the western, and many Greek colonies in the eastern parts, it was divided, with respect to its inhabitants, into three great parts, viz. *Gallia Cisalpina*, *Italy* properly so called, and *Magna Græcia*. The most western and northern parts of Italy were in great part possessed by the Gauls: and hence took the name of *Gallia*, with the epithets of *Cisalpina* and *Citerior*, because they lay on the side of the Alps next to Rome; and *Transalpina*, with relation to the Roman gown or dress which the inhabitants used; but this last epithet is of a much later date than the former. This appellation was antiquated in the reign of Augustus, when the division of Italy into eleven provinces, introduced by that prince, took place. Hence it is that the name of *Cisalpine Gaul* frequently occurs in the authors who flourished before, and scarce ever in those who wrote after the reign of Augustus. This country extended from the Alps and the river Varus, parting it from *Transalpine Gaul*, to the river Aesius; or, as Pliny will have it, to the city of Ancona, in the ancient Picenum. On the north, it was divided from *Rætia* by the Alps, called *Alpes Rætice*; and from *Illyricum* by the river *Formio*: but on this side, the borders of Italy were, in Pliny's time, extended to the river *Arbia* in *Istria*. On the south, it reached to the *Ligustic sea*, and the *Apennines* parting it from *Etruria*; so that under the common name of *Cisalpine Gaul* were comprehended the countries lying at the foot of the Alps, called by Pliny and Strabo the *Subalpine countries*, *Liguria*, *Gallia Cispadana*, and *Transpadana*. *Italy*, properly so called, extended, on the coast of the Adriatic, from the city of Ancona to the river Trento, now the *Fortore*; and, on the Mediterranean, from the *Macra* to the *Silarus*, now the *Sile*. *Magna Græcia* comprised *Apulia*, *Lucania*,

Italy.

and the country of the *Brutii*. It was called *Greece*, because most of the cities on the coast were Greek colonies. The inhabitants gave it the name of *Great*, not as if it was larger than Greece, but merely out of ostentation, as Pliny informs us.

All these countries were inhabited by a great number of different nations settled at different times, and from many different parts. The names of the most remarkable of them were the *Aborigines*, or those whose origin was utterly unknown, and consequently were thought to have none; the *Sabines*, *Hetrurians* or *Tuscan*, the *Umbri*, *Samnites*, *Campani*, *Apulii*, *Calabrii*, *Lucanii*, the *Brutii*, and the *Latins*. From a colony of the latter proceeded the Romans, who gradually subdued all these nations one after another, and held them in subjection for upwards of 700 years. Subdued by the Romans.

All these nations were originally brave, hardy, temperate, and well skilled in the art of war; and the Romans much more so than the rest. Their subjection to Rome, however, insured them to slavery; their oppression by the emperors broke their spirit; and the vast wealth which was poured into the country from all parts of the world, during the time of the Roman prosperity, corrupted their manners, and made them degenerate from their former valour. Of this degeneracy the barbarous nations of the north took the advantage to invade the empire in innumerable multitudes. Though often repelled, they never failed to return; and it was found necessary to take great numbers of them into the Roman service, in order to defend the empire against the rest of their countrymen. In the year 476, the *Heruli*, presuming on the services they had done the empire, demanded a third part of the lands of Italy; and being refused, chose one *Odoacer*, a man of low birth, but of great valour and experience, for their king; and having totally destroyed the remains of the Roman empire, proclaimed *Odoacer* king of Italy. The new monarch, however, did not think proper to alter the Roman form of government, but suffered the people to be governed by the senate, consuls, &c. as before. He enjoyed his dignity in peace till the year 488, when *Zeno*, emperor of Constantinople, being hard pressed by *Theodoric* king of the *Ostrogoths*, advised him to turn his arms against *Odoacer*, whom he could easily overcome, and thus make himself sovereign of one of the finest countries in the world.

By the Heruli.

Theodoric accepted the proposal with great joy, and set out for Italy, attended by an infinite number of people, carrying with them their wives, children, the Ostrogoths, and effects, on waggons. Several Romans of great distinction attended him in this war; while, on the other hand, many of his countrymen chose to remain in *Thrace*, where they became a separate nation, and lived for a long time in amity with the Romans. The *Goths*, being destitute of shipping, were obliged to go round the *Adriatic*. Their march was performed in the depth of winter; and, during the whole time, a violent famine and plague raged in their army. They were also opposed by the *Cepidæ* and *Sarmatians*; but at last, having defeated these enemies, and overcome every other obstacle, they arrived in Italy in the year 489. *Theodoric* advanced to the river *Sontius*, now *Zonzo*, near *Aquileia*, where he halted for some time to refresh his troops. Here he was met by *Odoacer*

at

Italy.

at the head of a very numerous army, but composed of many different nations commanded by their respective chiefs, and consequently without sufficient union or zeal for the common cause. Theodoric therefore gained an easy victory, cut many of his enemies in pieces, and took their camp. Odoacer retired to the plains of Verona, and encamped there at a small distance from the city; but Theodoric pursued him close, and soon forced him to a second engagement. The Goths obtained another victory; but it cost them dear. Odoacer's men made a much better resistance than before, and great numbers fell on both sides. The victory, however, was so far decisive, that Odoacer was obliged to fluit himself up in Ravenna; so that Theodoric having now no enemy to oppose him in the field, besieged and took several important places, and among the rest Milan and Pavia. At the same time, Tufa, commander in chief of Odoacer's forces, deserted to the enemy with the greatest part of the troops he had with him, and was immediately employed in conjunction with a Gothic officer in pursuit of his sovereign. Odoacer had left that city, and was advanced as far as Faenza, where he was closely besieged by Tufa; but the traitor, declaring again for his old master, joined him with all his troops, and delivered up several officers that had been appointed by Theodoric to serve under him. These were sent in irons to Ravenna; and Odoacer being joined by Frideric, one of Theodoric's allies, with a considerable body of troops, once more advanced against his enemies. He recovered all Liguria, took the city of Milan, and at last besieged Theodoric himself in Pavia. The Goths, having brought all their families and effects along with them, were greatly distressed for want of room; and must have undoubtedly submitted, if their enemies had continued to agree among themselves. The quarrels of his followers proved the ruin of Odoacer. Theodoric, finding that the enemy remitted the vigour of their operations, applied for succours to Alaric king of the Visigoths, who had settled in Gaul. As the Visigoths and Ostrogoths were originally one and the same nation, and the Visigoths had received among them, some years before, a great number of Ostrogoths, under the conduct of Videmir, cousin-german to Theodoric, the supplies were readily granted. The inaction of the enemy gave these succours time to arrive; upon which Theodoric instantly joined them, and, marching against his enemies, gave them a total overthrow. Odoacer again took refuge in Ravenna, but was closely besieged by Theodoric in 490. The siege lasted three years; during which Odoacer defended himself with great bravery, and greatly annoyed the besiegers with his sallies. Theodoric, however, impatient of delay, leaving part of his army to blockade the city, marched with the rest against the strong holds which Odoacer had garrisoned. All these he reduced with little difficulty; and in 492 returned to the siege of Ravenna. The besieged were now reduced to great straits both by the enemy without and a famine within, the price of wheat being risen to fix pieces of gold per bushel. On the other hand, the Goths were quite worn out with the fatigues of such a long siege; so that both parties being willing to put an end to the war, Odoacer sent John bishop of Ravenna to Theodoric with terms of accommodation.

Jornandes informs us, that Odoacer only begged his life; which Theodoric bound himself, by a solemn oath, to grant him: but Procopius says, that they agreed to live together on equal terms. This last seems very improbable: but whatever were the terms of the agreement, it is certain that Theodoric did not keep them; for having a few days after invited Odoacer to a banquet, he dispatched him with his own hand. All his servants and relations were massacred at the same time; except his brother Aemulphus, and a few more, who had the good luck to make their escape, and retired beyond the Danube.

Thus Theodoric became master of all Italy, and took upon himself the title of *king* of that country, as Odoacer had done before; though, with a pretended deference to the emperor of Constantinople, he sent messengers asking liberty to assume that title after he had actually taken it. Having secured his new kingdom as well as he could by foreign alliances, Theodoric next applied himself to legislation, and enacted many salutary laws besides those of the Romans which he retained. He chose Ravenna for the place of his residence, in order to be near at hand to put a stop to the incursions of the barbarians. The provinces were governed by the same magistrates that had presided over them in the times of the emperors, viz. the *consulares*, *correctores*, and *praesides*. But besides these, he sent, according to the custom of the Goths, inferior judges, distinguished by the name of *counts*, to each city. These were to administer justice, and to decide all controversies and disputes. And herein the polity of the Goths far excelled that of the Romans. For in the Roman times a whole province was governed by a consularis, a corrector, or a praeses, who resided in the chief city, and to whom recourse was to be had, at a great charge, from the most remote parts: but Theodoric, besides these officers, appointed, not only in the principal cities, but in every small town and village, inferior magistrates of known integrity, who were to administer justice, and by that means save those who had law-suits the trouble and expence of recurring to the governor of the whole province; no appeals to distant tribunals being allowed, but in matters of the greatest importance, or in cases of manifest injustice.

Under the administration of Theodoric Italy enjoyed as great happiness as had been experienced under the very best emperors. As he had made no alteration in the laws except that abovementioned, so he contented himself with the same tributes and taxes that had been levied by the emperors; but was, on all occasions of public calamity, much more ready to remit them than most of the emperors had been. He did not treat the natives as those of the other Roman provinces were treated by the barbarians who conquered them. These stripped the ancient proprietors of their lands, estates, and possessions, dividing them among their chiefs; and giving to one a province with the title of *duke*, to another a frontier country with the title of *marquis*; to some a city with the title of *count*, to others a castle or village with the title of *baron*. But Theodoric, who piqued himself upon governing after the Roman manner, and observing the Roman laws and institutions, left every one in the full enjoyment of his ancient property. As to religion, though he himself, like most of his countrymen, professed the tenets of Arius, he

Italy.

7
Submits,
and is put
to death.

8

Theodoric
proclaimed
king of Ita-
ly, and uses
his power
with mod-
eration.

al.

Italy.

allowed his subjects to profess the orthodox doctrine without molestation, giving liberty even to the Goths to renounce the doctrines in which they had been educated, and embrace the contrary opinions. In short, his many virtues, and the happiness of his subjects, are celebrated by all the historians of those times. The end of his reign, however, was sullied by the death of the celebrated philosopher Boethius, and his father-in-law Symmachus. They were both beleagued in Pavia, on an unjust suspicion of treason; and scarce was the sentence put in execution when the king repented, and abandoned himself to the most pungent sorrow. The excess of his grief affected his understanding; for, not long after, the head of a large fish being served up to supper, he fancied the head of the fish to be that of Symmachus threatening him in a ghastly manner. Hereupon, seized with horror and amazement, he was carried to his bed-chamber, where he died in a few days, on the 2d of September 526.

After the death of Theodoric, the kingdom devolved to Athalaric his grandson; who being at that time only eight years of age, his mother Amalasuntha took upon her the regency. Her administration was equally upright with that of Theodoric himself; but the barbarians of whom her court was composed, finding fault with the encouragement she gave to learning, forced her to abandon the education of her son, who thereupon plunged into all manner of wickedness, and behaved to his mother with the greatest arrogance; and the faction finding themselves thus strengthened, at last commanded the queen to retire from court.

Amalasuntha, exerting her authority, seized three of the ringleaders of the sedition, whom she confined in the most remote parts of Italy. But these maintaining a secret correspondence with their friends and relations, never ceased to stir up the people against her; inasmuch, that the queen, apprehending that the faction might in the end prevail, wrote to the emperor Justinian, begging leave to take refuge in his dominions. The emperor readily complied with her request, offering a noble palace at Durazzo for her habitation; but the queen having in the mean time caused the three ringleaders to be put to death, and no new disturbances arising thereupon, she did not accept of the emperor's offer. In 533, Athalaric having contracted a lingering distemper by his riotous living and debaucheries, Amalasuntha, to avoid the calamities with which Italy was threatened in case of his death, formed a design of delivering it up to Justinian; but before her scheme was ripe for execution, Athalaric died. Upon which the queen took for her colleague one Theodotus her cousin; obliging him, however, to swear that he would suffer her to enjoy and exercise her former power. This he very readily did; but soon forgot his promise; and, when she took the liberty to remind him of it, caused her to be seized and confined in an island of the lake Bolsena in Tuscany. But as Theodotus had great reason to believe that this conduct would be resented by Justinian, he obliged her to write to him that no injury or injustice had been done her. Along with this letter he sent one written by himself, and filled with heavy complaints against Amalasuntha. The emperor, however, was so far from giving credit to what Theodotus urged against her, that he openly espoused her cause, wrote her a most affectionate letter, and as-

sured her of his protection. But before this letter could reach her, the unhappy princess was strangled in the bath by the friends of those whom in the reign of her son he had deservedly put to death for raising disturbances in the state.

On the news of Amalasuntha's death, Justinian resolved upon an immediate war with the Goths; and, to facilitate the enterprise, used his utmost endeavours to induce the Franks to assist him. To his solicitations he added a large sum of money; which last was very acceptable to his new allies. They promised to assist the emperor to the utmost of their power; but, instead of performing their promise, while Justinian's arms were employed against the Goths, Thierri, the eldest son of Clovis, seized on several cities of Liguria, the Alpes Cottiae, and great part of the present territory of Venice, for himself. Justinian, however, found sufficient resources in the valour of Belisarius, notwithstanding the defection of his treacherous allies. This celebrated general was vested with the supreme command, and absolute authority. His instructions were to pretend a voyage to Carthage, but to make an attempt upon Sicily; and, if he thought he could succeed in the attempt, to land there; otherwise to sail for Africa, without discovering his intentions. Another general, named *Mundus*, commander of the troops in Illyricum, was ordered to march into Dalmatia, which was subject to the Goths, and attempt the reduction of Salona, the better to open a passage into Italy. This he accomplished without difficulty, and Belisarius made himself master of Sicily sooner than he himself had expected. The island was reduced on the last of December 535; upon which Belisarius, without loss of time, passed over to Reggio, which opened its gates to him. From Reggio he pursued his march to Rome, the provinces of Abrutium, Lucania, Puglia, Calabria, and Samnium, readily submitting to him. The city of Naples endured a siege; but Belisarius entered in thro' an aqueduct, and gave it up to be plundered by his soldiers.

Theodotus, alarmed at these successes, and having neither capacity nor inclination to carry on the war, sent ambassadors to Justinian with proposals of peace. He agreed to renounce all pretensions to the island of Sicily; to send the emperor yearly a crown of gold weighing 300 pounds; to supply him with 3000 men whenever he should think proper to demand them. Several other articles were contained in the proposal, which amounted to the owning of Justinian for his lord, and that he held the crown of Italy only through his favour. As he apprehended, however, that these offers might not yet be satisfactory, he recalled his ambassadors for further orders. They were now desired to inform Justinian, that Theodotus was willing to resign the kingdom to him, and content himself with a pension suitable to his quality. But he obliged them by an oath not to mention this proposal, till they found that the emperor would not accept of the offer. The first proposals were accordingly rejected as they had supposed; upon which the ambassadors produced the second, signed by Theodotus himself, who, in his letter to the emperor, told him among other things, that being unacquainted with war, and addicted to the study of philosophy, he preferred his quiet to a kingdom. Justinian, transported with joy, and

Italy.

12
For which reason Justinian makes war on the Goths.

9
Boethius and Symmachus, and dies of grief.

10
Amalasuntha Regent; governs equitably.

11
Is treacherously imprisoned, and put to death

13
Theodotus offers to resign the kingdom.

Italy.

and imagining the war already finished, answered the king in a most obliging manner, extolling his wisdom, and giving him, besides what he demanded, the greatest honours of the empire. The agreement being confirmed by mutual oaths, lands were assigned to Theodotus out of the king's domain, and orders were dispatched to Belisarius to take possession of Italy in his name.

In the mean time a body of Goths having entered Dalmatia, with a design to recover the city of Salonæ, were encountered by an inferior army of Romans, commanded by the son of Mundus abovementioned. The Goths proved victorious; and the young general of the Romans was killed, and most of his army cut in pieces. Mundus marched against the enemy to revenge the death of his son; but met with no better success, his troops being defeated, and he himself killed in the engagement. Upon this the Romans abandoned Salonæ and all Dalmatia; and Theodotus, elated with his success, refused to fulfill the articles of the treaty. Justinian dispatched Constantianus, an officer of great valour and experience, into Illyricum, with orders to raise forces there, and to enter Dalmatia; at the same time he wrote to Belisarius to pursue the war with the utmost vigour.

The Goths were now reduced to the greatest straits. Constantianus drove them out of Dalmatia; and Belisarius having reduced all the provinces which compose the present kingdom of Naples, advanced towards Rome. The chief men of the nation, finding their king incapable of preventing the impending ruin, assembled without his consent, and dispatched ambassadors to Belisarius with proposals of peace. These proposals were rejected; and Belisarius returned for answer that he would hearken to no terms, nor sheath his sword, till Italy was rennexed to the empire to which it belonged. The Goths finding Theodotus still inactive, unanimously deposed him; and chose in his stead one Vitiges, a man of great valour, but of a mean descent. Theodotus fled to Ravenna; but the new king dispatched after him a messenger, who soon overtook him and cut off his head.

Vitiges began his government by writing a circular letter, in which he exhorted his countrymen to exert their ancient courage, and fight bravely for their lives and liberties. He then marched with what forces he could collect towards Rome; but not thinking himself able to defend that city against the Roman forces, he abandoned it to Belisarius, and arriving at Ravenna was joined by the Goths from all parts, so that he soon found himself at the head of a considerable army. Belisarius in the mean time entered Rome without opposition, on the 9th or 10th of December 537. The Gothic garrison retired by the Porta Flaminia, while Belisarius entered by the Porta Anagnina. Leudaris, governor of the city, who staid behind, was sent, together with the keys, to the emperor. Belisarius immediately applied himself to the repairing of the walls and other fortifications; filled the granaries with corn, which he caused to be brought from Sicily; and stored the place with provisions, as if he had been preparing for a siege; which gave no small uneasiness to the inhabitants, who chose rather that their city should lie open to every invader, than that they should be liable to the calamities of a siege. While Belisarius

Vol. V.

was thus employed at Rome, the city of Benevento, with great part of the territory of Samnium, was delivered up to him: at the same time the cities of Narnia, Spoleto, and Perugia, revolting from the Goths, received Roman garrisons; as did most of the cities of Tuscany.

In the mean time, Vitiges having collected an army of 150,000 men, resolved to march directly to Rome, and engage Belisarius; or if he declined an engagement, to lay siege to the city. But apprehending that the Franks, who were in confederacy with the emperor, might fall upon him at the same time, he sent ambassadors to them, with offers of all the Gothic possessions in Gaul, besides a considerable sum of money, provided they joined him against the emperor. The Franks with their usual treachery consented to the proposal, received the money and the territories agreed on, and then refused to fulfill the terms of the treaty. Vitiges, however, began his march to Rome, leaving behind him all the fortified towns on the road, the reduction of which he knew would cost him too much trouble. Belisarius, whose army, reduced by the many towns he had garrisoned, did not now amount to above 5000 men, dispatched messengers to Constantianus in Tuscany; and to Belias, by nation a Goth, but of the emperor's party, in Umbria, with orders to join him with all possible expedition; writing at the same time to the emperor himself for supplies, in the most pressing manner. Constantianus joined him pursuant to his orders; and soon after, Belias, who, falling in with part of the enemy's vanguard, killed a considerable number of them, and put the rest to flight. Belisarius had built a fort upon a bridge about a mile from Rome, and placed a strong garrison in it to dispute the passage with the enemy; but the garrison, seized with a panic at the approach of the Goths, abandoned their post in the night, and fled into Campania. Early in the morning, Vitiges passed over great part of his army, and marched on till he was met by Belisarius, who, knowing nothing of what had happened, came with 1000 horse to view the ground about the bridge. He was greatly surprised when he beheld the enemy marching up against him: however, lest he should heighten their courage by his flight or retreat, he stood his ground, and received the enemy at the head of his small body, exposing himself, without his usual prudence and discretion, to the greatest dangers. Being known by some fugitives, and discovered to the enemy, they all aimed at him alone, which made his own men the more solicitous to defend him; so that the whole contest was for some time about his person. At last the Goths were driven back to their camp, which the Romans with great temerity attempted to force. In this attempt, however, they met with such a vigorous resistance, that they soon abandoned the enterprize, and retired with precipitation to a neighbouring eminence; whence they were forced down by the enemy, put to flight, and pursued to the very gates of the city. Here they were in greater danger than ever; for those within, fearing that the enemy might in that confusion enter with them, refused to admit them. The general himself cried out earnestly to them, telling who he was, and commanding them to open the gates; but as they had been informed by those who first fled, that he was slain,

22 O

slain,

Italy.

He collected a great army.

Theodotus refuses to fulfill the articles of the treaty.

Theodotus is deposed, and Vitiges chosen in his stead.

Obstinate engagement between the Goths and Romans.

Italy.

slain, and they could not distinguish him on account of the blood and dust with which his face was covered, they gave no ear to what he said. In this extremity, having encouraged his men, who were now driven into a narrow compass, to make a last effort, he put himself at their head, and attacked the enemy with such fury, that the Goths, imagining fresh troops were falling out upon them, began to give ground, and at last retired to their camp. The Roman general did not pursue them; but entered the city, where he was received with loud acclamations.

19
Rome be-
sieged by
the Goths.

A few days after, the city was closely invested by Vitiges; who, to distress the inhabitants, pulled down the aqueducts by which water was conveyed into the city, and which had been built at an immense charge by the Roman emperors. Belisarius on his part omitted nothing for his defence; inasmuch that the cowardly citizens assembled in a tumultuous manner, and rallied at the general on account of his supposed temerity. Vitiges, to encourage this mutinous disposition, dispatched ambassadors to the senate with proposals of peace. These ambassadors, however, were dismissed without any answer, and the siege was begun with great vigour. Belisarius made a gallant defence; and in seven months is said to have destroyed 40,000 of the Goths. About this time he received a supply of 1600 archers from the emperor; and these, in several successful sallies, are said to have killed 4000 more of the enemy.

The Romans, elated with their successes, now became impatient for an engagement; and at last, notwithstanding all the remonstrances of their general, forced him to lead them out against the enemy. The success was answerable to the rash attempt. The Romans were defeated, with the loss of some of their bravest officers, and a great many of their common soldiers; after which they contented themselves with falling out in small parties, which they commonly did with the greatest success.

But though the Romans had the satisfaction of thus cutting off their enemies, they were most grievously afflicted with a famine and plague; inasmuch that the inhabitants, no longer able to bear their calamities, were on the point of forcing Belisarius to venture a second battle, when a seasonable supply of troops, viz. 3000 Iasurians, 800 Thracian horse, and 1300 horse of other nations, together with 500 Italians who joined them by the way, arrived at Rome. Belisarius immediately sallied out by the Flaminian gate, and fell upon the Goths in order to give his allies time to enter by the opposite side of the city, which they did without the loss of a man.—The Goths, hearing of the arrival of these troops, and their numbers being magnified as is usual in such cases, began to despair of becoming masters of the city; especially as the famine and plague raged with great violence in their camp, and their army was much reduced. Ambassadors were therefore dispatched to Belisarius with proposals of peace; but the only thing they could obtain was a cessation of arms for three months, during which time they might send ambassadors to the emperor. The negotiations with the emperor, however, proved unsuccessful; and the siege was pursued with great vigour till Vitiges received the news of the taking of Rimini by the Romans. As this city

was but a day's journey from Ravenna, the Goths were so much alarmed, that they immediately raised the siege of Rome, after it had continued a year and nine days. Belisarius fell upon their rear as they passed the bridge of the Tiber, and cut great numbers of them in pieces, while others, struck with a panic, threw themselves into the river and were drowned.

Italy.
19
The siege
raised.

The first enterprize of Vitiges, after raising the siege of Rome, was an attempt upon Rimini: but while he was employed in this siege, the Romans made themselves masters of Milan; upon which a Gothic general named *Uraia*, was immediately dispatched with a powerful army to retake it. In the mean time, however, a supply of 7000 Romans arrived from the emperor, under the command of Narfes, a celebrated general. The immediate consequence of this was the raising of the siege of Rimini; for Vitiges, perceiving the two Roman armies coming against him, and concluding, from the many fires they made, that they were much more numerous than they really were, fled in such haste, that the greatest part of the baggage was left behind. The confusion of the Goths was so great, that had not the garrison been extremely feeble, they might have easily cut them off in their retreat, and thus put an end to the war at once. The success of the Romans, however, was now retarded by some misunderstandingings between the two generals; so that, though Belisarius made himself master of Urbinum and Urbiventum, while Narfes reduced some other places; yet the important city of Milan was suffered to fall into the hands of the Goths, who massacred all the inhabitants that were able to bear arms, to the number of 300,000, and sold the women for slaves. The city was also totally demolished; and this disaster made such an impression on the mind of Justinian, that he immediately recalled Narfes, and gave the command of his troops to Belisarius.

20
Milan tak-
en by the
Goths.

Vitiges, who had promised himself great advantages from the disagreement of the two generals, was much disappointed by the recall of Narfes; and therefore, dreading the power of Belisarius when at the head of a formidable army, thought of engaging in alliance with some foreign prince. In his choice, however, he was somewhat at a loss. He knew the treachery of the Franks, and therefore did not apply to them. He applied to the Lombards; but, though tempted by the offer of a large sum of money, they continued inviolably attached to the Roman interest. At last he found means to persuade Chosroes king of Persia to make war upon Justinian, which he thought would infallibly procure the recall of Belisarius. But the Roman general, understanding his design, pushed on the war in the most vigorous manner; while in the mean time, the treacherous Franks, thinking both na-
tions sufficiently weakened by their mutual hostilities, resolved to attack both, and seize upon the country for which they contended. Accordingly, Theodebert, unmindful of the oaths he had taken both to the Goths and Romans, passed the Alps at the head of 150,000, or, as some will have it, 200,000 men, and entered Liguria. As no hostilities were committed by them on their march, the Goths concluded that they were come to their assistance; and therefore took care to supply them with provisions. Thus they crossed the Po without opposition; and having secured

21
Italy inva-
ded by the
Franks.

the

Italy.

the bridge, marched towards the place where a body of Goths were encamped; who, looking upon them as friends, admitted them without hesitation. But they were soon convinced of their mistake; for the Franks falling unexpectedly upon them, drove them out of the camp with great laughter, and seized on their baggage and provisions. A body of Romans that lay at a small distance from the Goths, concluding that they had been defeated by Belisarius, advanced with great joy to meet *him* as they imagined; but the Franks falling unawares upon them, treated them as they had done the Goths, and made themselves masters of their camp. Thus they acquired a very considerable booty and store of provisions: but the latter being soon consumed, and the country round about quite exhausted, vast numbers of the Franks perished; so that Theodebert at last found himself obliged to return. In his way he destroyed Genoa, and several other places, and arrived in his own dominions loaded with booty.

22
Success of
Belisarius.

In the mean time, Belisarius was making great progress. He took the cities of Auximum and Fesulae, after an obstinate siege; the inhabitants of the former having for some time fed on grass before they would surrender. After this he invested Ravenna, the capital of all the Gothic dominions in Italy. The place was defended by a very numerous garrison, commanded by the king in person, who exerted all his bravery in the defence of his metropolis. As the siege, however, was pushed on with great vigour, it was evident that the city must at last submit; and the great successes of the Romans began to give jealousy to the neighbouring potentates. Theodebert king of the Franks offered to assist Vitiges with an army of 500,000 men; but Belisarius, being informed of this negotiation, sent ambassadors to Vitiges, putting him in mind of the treachery of the Franks, and assured him that the emperor was ready to grant him very honourable terms. The king, by the advice of his counsellors, rejected the alliance of the Franks, and sent ambassadors to Constantinople; but in the mean time, Belisarius, in order to bring the citizens to his own terms, bribed one of them to set fire to a magazine of corn, by which means the city was soon straitened for want of provisions. But, notwithstanding this disaster, they still continued to hold out, till the arrival of the ambassadors from Constantinople, who brought very favourable terms. These were, That the country beyond the Po, with respect to Rome, should remain to the Goths; but that the rest of Italy should be yielded to the emperor, and the royal treasure of the Goths should be equally divided between him and the king. To these conditions, however, Belisarius positively refused to assent; being desirous of leading captive the king of the Goths, as he had formerly done the king of the Vandals, to Constantinople. He therefore pursued the siege with more vigour than ever, without hearkening to the complaints of his soldiers and officers, who were quite tired out with the length of the siege: he only obliged such of the officers as were of opinion that the town could not be taken, to express their opinion in writing, that they might not deny it afterwards.

The Goths were as weary of the siege as the Romans; but, fearing lest Justinian should transplant

Italy.

them to Thrace, formed a resolution, without the consent of their king, of surrendering to Belisarius himself, and declaring him emperor of the west. To this they were the more encouraged by the refusal of Belisarius to agree to the terms proposed by the emperor, from whence they concluded that he designed to revolt, and make himself emperor of Italy. Of this, however, Belisarius had no design; but thought proper to accept of the title, in order to accelerate the surrender of the city, after acquainting his principal officers with what had passed. Vitiges at last discovered the plot; but finding himself in no condition to oppose it, he commended the resolution of his people, and even wrote to Belisarius, encouraging him to take upon him the title of *king*, and assuring him of his assistance. Hereupon Belisarius pressed the Goths to surrender; which, however, they still refused, till he had taken an oath that he would treat them with humanity, and maintain them in the possession of all their rights and privileges. Upon this he was admitted into the city, where he behaved with great moderation towards the Goths; but seized on the royal treasure, and secured the person of the king. The Roman army, when it entered Ravenna, appeared so very inconceivable, that the Gothic women, on beholding it, could not forbear spitting in the faces of their husbands, and reviling them as cowards.

23
Ravenna reduced,
and Vitiges
taken prisoner.

The captivity of Vitiges, and the taking of Ravenna, did not put an end to the war. Belisarius was soon after recalled to take the command of the army in the east. The Goths were greatly surprised that he should leave his new kingdom out of regard to the orders of the emperor; but, after his departure, chose one Ildebal, a man of great experience in affairs both civil and military, for their king. He revived the drooping spirits of his countrymen, defeated the Romans, and reduced all the province of Venetia; but was in a short time murdered, and Eraric, a Rugian, succeeded to the throne. He was scarce invested with the sovereignty, when his subjects began to think of deposing him, and raising Totila to the throne; which the latter accepted, upon condition that they previously dispatched Eraric. This was accordingly done; after which Totila was proclaimed king of Italy, in the year 542.

The new king proved a very formidable enemy to the Romans, who now lost ground every-where. They made an attempt on the city of Verona; in which they miscarried through their own avarice, having disputed about the division of the plunder till the opportunity of taking the town was past. They were next defeated in two bloody engagements; the consequence of which was, that the Goths made themselves masters of all the strong places in Tuscany. From thence marching into Campania and Samnium, they reduced the strong town of Beneventum, and laid siege to Naples. During the siege of this last place, several detachments were sent from the king's army, which took Cumæ, and recovered all Brutia, Lucania, Apulia, and Calabria, where they found considerable sums which had been gathered for the emperor's use. The Romans, in the mean time, disheartened by their losses, and deprived of those sums which should have paid their wages, refused to take the field. A considerable fleet was therefore sent by Justinian to the re-

24
Success of
Totila against
the Romans.

Italy.

Italy.

25
Rome be-
sieged.

lief of Naples: but Totila, having timely notice of this design, manned, with incredible expedition, a great number of light vessels; which, falling unexpectedly on the Roman fleet, took or sunk every ship, and made prisoners of all on board, excepting a few who escaped in their boats. A similar fate attended another fleet dispatched from Sicily for the same purpose. They put to sea in the depth of winter; and, meeting with a violent storm, were driven ashore near the enemy's camp; who sunk the ships, and made what slaughter they pleased of the seamen and soldiers. Upon this second disaster, the Neapolitans, despairing of further relief, submitted to Totila; who granted them honourable terms, and treated them with great humanity. As they had been long pinched with famine, Totila, apprehending they might endanger their lives by indulging their appetites too much at first, placed guards at the gates to prevent their going out, taking care at the same time to supply them sparingly with provisions, but increasing their allowance every day. Being thus by degrees restored to their former strength, he ordered the gates to be set open, and gave every one full liberty to stay in the city, or remove, as he thought fit. The garrison he treated with extraordinary kindness. They were first supplied with ships to carry them to Constantinople; but the king having discovered that their real design was to sail to Rome, in order to reinforce the garrison of that city, (which they knew he was soon to besiege,) he was so far from punishing them as they expected, that he furnished them with horses, waggons, and provisions, and ordered a body of Goths to escort them to Rome by land, as the winds had proved unfavourable for their passage by sea.

Totila having thus become master of Naples and most of the other fortresses in these parts, began to think of reducing Rome also. He first attempted to persuade the citizens to a surrender: but finding his persuasions ineffectual, he sent a detachment of his army into Calabria to reduce Otranto, which had not yet submitted; after which, he marched with the rest of his forces against the towns in the neighbourhood of Rome. The city of Tibur, now Tivoli, about 18 miles from Rome, was betrayed to him, and all the inhabitants, together with their bishop, put to the sword. Several other strong holds in the neighbourhood of that city he took by storm; so that Rome was in a manner blocked up by land, all communication with the neighbouring country being cut off.

Justinian, in the mean time, being greatly perplexed by the bad news he every day received from Italy, recalled Belisarius from Persia, notwithstanding the success which attended him there. To save Rome, however, was now impossible even for Belisarius himself. As soon as he arrived in Italy, finding himself unable either to relieve the towns which were besieged, or to stop the progress of the Goths, he dispatched letters to Justinian, informing him, that being destitute of men, arms, and money, it was impossible for him to prosecute the war; upon which the emperor ordered new levies to be made, all the veterans being engaged in the Persian war. In the mean time, however, Totila pursued his good fortune; took the cities of Firmum, Asculum, Auximum, Spoletum, &c. and at length advanced to Rome, which he invested on all

sides. As he drew near the city, two officers, whom Belisarius had sent into the city, ventured to make a sally, though contrary to the express orders of their general, thinking they should surprise the Goths; but they were themselves taken in an ambuscade, and most of their men being cut in pieces, narrowly escaped falling into the hands of the enemy. Belisarius made several attempts to relieve the city: but all of them, however well concerted, by some accident or other proved unsuccessful; which gave him so much uneasiness, that he fell into a feverish disorder, and was for some time thought to be in danger of his life. The city was soon reduced to great straits: a dreadful famine ensued; and the unhappy citizens having consumed every thing that could be supposed to give them nourishment, even the grass that grew near the walls, were obliged to feed on their own excrements. Many put an end to their lives, in order to free themselves from the intolerable calamities they suffered. The rest addressed their governor Bessas in the most pathetic manner, intreating him to supply them with food; or if that was not in his power, either to give them leave to go out of the town, or to put an end to their miseries by putting them to death. Bessas replied, that to supply them with food was impossible, to let them go unsafe, and to kill them impious. In the end, however, he suffered those who were willing to retire, to leave the city, upon paying him a sum of money; but most of them either died on the road, or were cut in pieces by the enemy. At last, the besieged, unable to bear their miseries any longer, began to mutiny, and to press their governor to come to an agreement with Totila. This, however, he still refused; upon which, four of the Isaurians who guarded one of the gates, went privately to the camp of Totila, and offered to admit him into the city. The king received this proposal with great joy; and sending four Goths of great strength and intrepidity into the town along with them, he silently approached the gates in the night-time with his whole army. The gates were opened by the Isaurians, as they had promised; and upon the first alarm, Bessas with most of the soldiers and officers, fled out of the town. The inhabitants took sanctuary in the churches; and only 60 of them and 26 soldiers were killed after the town was taken. Totila, however, gave his soldiers full liberty to plunder the city: which they did for several days together, stripping the inhabitants of all their wealth, and leaving nothing in their houses but naked walls; by which means many persons of distinction were reduced to beg their bread from door to door. In the house of Bessas was found an immense treasure, which he had scandalously amassed during the siege, by selling to the people, at an exorbitant price, the corn which had been stored up for the use of the garrison.

Totila, thus become master of Italy, sent ambassadors to Justinian with very respectful letters, desiring to live on the same terms with him that Theodoric had done with his predecessor Anastasius, promising in that case to respect him as his father, and to assist him, when he pleased, with all his force, against any other nation whatever. On the contrary, if the emperor rejected his offers, he threatened to level Rome with the ground, to put the whole senate to the sword, and carry the war into Illyricum. The emperor returned no other

26
And taken.

other

Italy.

ther answer, than that he referred the whole to Belisarius, who had full power to manage all things of that nature. Upon this Totila resolved to destroy the city; and had actually thrown down a third part of the wall, when he received a letter from Belisarius, dissuading him from his intention. After having seriously considered this letter, Totila thought proper to alter his resolution with regard to the destruction of the city; but sent every one of the inhabitants into Lucania, without leaving a single person in the metropolis. Belisarius hearing of this, immediately returned to the capital, and undertook to repeople and repair it. He cleared the ditch which had been filled by Totila, but was for the present obliged to fill up the breaches in the walls with stones loosely heaped upon one another; and in this situation the city was again attacked by the Goths. Belisarius, however, had taken care to supply the inhabitants with plenty of provisions, so that they were now in no danger of suffering by famine; and the assaults of the enemy were vigorously repelled notwithstanding the bad situation of the fortifications, so that Totila at last abandoned the enterprize.

27
Belisarius
recalled.

In the mean time the Persians gained great advantages over the Romans in the East, so that there was a necessity for recalling Belisarius a second time. He was no sooner gone, than Totila renewed his efforts with greater vigour than ever; and at the same time the Franks, concluding that both Romans and Goths would be much weakened by such a destructive war, seized upon Venetia which belonged to both nations, and made it a province of the French empire. Totila did not oppose them; but having obtained a reinforcement of 6000 Lombards, returned immediately before Rome, fully intent on making himself master of that metropolis. Having closely invested it by sea and land, he hoped in a short time to reduce it by famine: but against this the governor wisely provided, by causing corn to be sown within the walls; so that he could probably have defied the power of Totila, had not the city been again betrayed by the Isaurians, who opened one of the gates, and admitted the enemy.

Thus the empire of the Goths was a third time established in Italy; and Totila, immediately on his becoming master of Rome, dispatched ambassadors to Justinian, offering to assist him as a faithful ally against any nation whatever, provided he would allow him the quiet possession of Italy. But Justinian was so far from hearkening to this proposal, that he would not even admit the ambassadors into his presence; upon which Totila resolved to pursue the war with the utmost vigour, and to make himself master, not only of those places which the Romans possessed in Italy, but in Sicily also. This he fully accomplished, when Narfes, who had formerly been joined in the command with Belisarius, was appointed general, with absolute and uncontrouled authority. But while this general was making the necessary preparations for his expedition, Totila, having equipped a fleet of 300 galleys, sent them to pillage the coasts of Greece, where they got an immense booty. They made a descent on the island of Corfu; and having laid it waste, they sailed to Epirus, where they surprised and plundered the cities of Nicopolis and Anchialus, taking many ships on the coast, among which were some laden with provisions for the army of Narfes. After these

28
Narfes sent
into Italy.

successes they laid siege to Ancona in Dalmatia: but, being defeated both by sea and land, Totila once more sent ambassadors to Constantinople, offering to yield Sicily and all Dalmatia, to pay an annual tribute for Italy, and to assist the Romans as a faithful ally in all their wars; but Justinian, bent upon driving the Goths out of Italy, would not even suffer the ambassadors to appear in his presence.

Totila, finding that no terms could be obtained, began to levy new forces, and make great preparations by sea and land. He soon reduced the islands of Corfica and Sardinia; but this was the last of his successes. Narfes arrived in Italy with a very formidable army; and an immense treasure to pay the troops their arrears, the want of which had been one great cause of the bad success of Belisarius in his last expedition. He immediately took the road to Rome; while Totila assembled all his forces, in order to decide the fate of Italy by a general engagement. The battle proved very obstinate; but at last the Gothic cavalry being put to the rout, and retiring in great confusion among the infantry, the latter were thereby thrown into such disorder, that they could never afterwards rally. Narfes, observing their confusion, encouraged his men to make a last effort; which the Goths not being able to withstand, betook themselves to flight, with the loss of 6000 men killed on the spot. Totila finding the day irrecoverably lost, fled with only five horsemen for his attendants; but was pursued and mortally wounded by a commander of one of the bodies of barbarians who followed Narfes. He continued his flight, however, for some time longer; but was at last obliged to halt in order to get his wound dressed, soon after which he expired.

29
Who de-
feats and
kills Totila.

This disaster did not yet entirely break the spirit of the Goths. They chose for their king one Teia, deservedly esteemed one of the most valiant men of their nation, and who had on several occasions distinguished himself in a most eminent manner. All the valour and experience of Teia, however, were now insufficient to stop the progress of the Romans. Narfes made himself master of a great number of cities, and of Rome itself, before the Goths could assemble their forces. The Roman general next proceeded to invest Comæ, which Teia determined at all events to relieve, as the royal treasure was lodged in that city. This brought on an engagement, which, if Procopius is to be credited, proved one of the most bloody that ever was fought. The Roman army consisted of vast multitudes brought from different nations: the Goths were few in comparison; but, animated by despair, and knowing that all was at stake, they fought with the utmost fury. Their king placed himself in the first rank, to encourage his men by his example; and is said to have given such proofs of his valour and conduct as equalled him to the most renowned heroes of antiquity. The Romans discovering him, and knowing that his death would probably put an end to the battle, if not to the war itself, directed their whole force against him, some attacking him with spears, and others discharging against him showers of darts and arrows. Teia maintained his ground with great intrepidity, received the mislive weapons on his shield, and killed a great number of the enemy with his own hand. When his shield was so loaded with darts that

30
And Teia.

he

Italy.

Italy.

he could not easily wield it, he called for another. Thus he shifted his shield three times; but as he attempted to change it another time, his breast being necessarily exposed for a moment, a dart struck him in that moment with such force, that he immediately fell down dead in the place where he had stood from the beginning of the battle, and upon heaps of the enemy, whom he had killed. The Romans, seeing him fall, cut off his head and exposed it to the sight of the Goths, not doubting that they would be immediately disheartened and retire. In this, however, they were disappointed. The Goths maintained the fight with great vigour, till night put an end to the engagement. The next day the engagement was renewed early in the morning, and continued till night; but on the third day, the Goths despairing of being able to overcome an enemy so much superior to them in numbers, sent deputies to Narfes, offering to lay down their arms, provided such of them as chose to remain in Italy were allowed to enjoy their estates and possessions, without molestation, as subjects of the empire, and those who were willing to retire elsewhere, were suffered to carry with them all their goods and effects. To these terms Narfes readily assented; and thus the empire of the Goths in Italy was finally destroyed, the country now becoming a province of the eastern Roman empire.

31
The end of
the empire
of the
Goths in
Italy.

In this conquest, Narfes had been assisted, as already observed, by many barbarous nations, among whom were the Lombards, at that time settled in Pannonia. On the conclusion of the war, they were dismissed with rich presents, and the nation for some time continued faithful allies to the Romans. In the mean time Justinian dying, Narfes, who governed Italy with an absolute sway, was accused to the emperor Justin II. and to the empress Sophia, of aspiring at the sovereignty of the country. Herenpon he was recalled, and Longinus sent to succeed him. As Narfes was an eunuch, the empress is reported to have said, that his employment at Constantinople should be to distribute in the apartment of her women the portion of wool which each was to spin. Narfes, enraged at this sarcasm, replied, that he should begin such a web as the should never be able to finish; and immediately dispatched messengers to Alboinus king of the Lombards, inviting them into Italy. Along with the messengers he sent some of the best fruits the country afforded, in order to tempt him the more to become master of such a rich kingdom.

31
Narfes in-
vites the
Lombards.

Alboinus, highly pleased with the opportunity of invading a country with which his subjects were already well acquainted, began, without loss of time, to make the necessary preparations for his journey. In the month of April 568, he set out with his whole nation, men, women, and children; carrying with them all their moveables. This promiscuous multitude arrived by the way of Istria; and advancing through the province of Venetia, found the whole country abandoned, the inhabitants having fled to the neighbouring islands in the Adriatic. The gates of Aquileia were opened by the few inhabitants who had courage to stay: most of them, however, had fled with all their valuable effects; and among the rest the Patriarch Paulinus, who had carried with him all the valuable sacred utensils of the churches. From Aquileia, Alboinus proceeded to

Forum Julii, of which he likewise became master without opposition. Here he spent the winter; during which time he erected Friuli into a dukedom, which has continued ever since. In 569, he made himself master of Trivigi, Oderzo, Monte Selce, Vicenza, Verona, and Trent; in each of which cities he left a strong garrison of Lombards under the command of an officer, whom he distinguished by the title of *duke*; but these dukes were only officers and governors of cities, who bore the title no longer than the prince thought proper to continue them in their command or government. Padua and some other cities Alboinus left behind him without attempting to reduce them, either because they were too well garrisoned, or because they lay too much out of his way. In 570, he entered Liguria. The inhabitants were so terrified at his approach, that they left their habitations with such of their effects as they could carry off, and fled into the most mountainous and inaccessible parts of the country. The cities of Brelcia, Barga-³²mo, Lodi, Como, and others quite to the Alps, being left almost without inhabitants, submitted of course; after which he reduced Milan, and was thereupon proclaimed king of Italy.

32
Who re-
duce the
greatest
part of I-
taly.

But though the Lombards had thus conferred the title of king of Italy on their sovereign, he was by no means possessed of the whole country, nor indeed was it ever in the power of the Lombards to get possession of the whole. Alboinus having made himself master of Venetia, Liguria, Emilia, Hetruria, and Umbria, applied himself to legislation and the civilisation of his subjects. But before he could make any progress in this work, he was taken off by the treachery of his wife; and Clephis, one of the nobles, chosen king in his stead. Clephis rebuilt some cities which had been ruined during the wars between the Goths and Romans, and extended his conquests to the very gates of Rome; but as he behaved both to the Romans and Lombards with the greatest cruelty, he was murdered, after a short reign of 18 months. His cruelty gave the Lombards such an aversion against regal power, that they changed their form of government, being governed only by their dukes for the space of ten years. During this interregnum, they proved successful in their wars with the Romans, and made themselves masters of several cities: but perceiving that their kingdom, thus divided, could not subsist, they resolved once more to submit to the authority of one man; and accordingly, in 585, Autharis was chosen king of the Lombards.

The great object of ambition to the new race of Lombard monarchs was the conquest of all Italy; and this proved at last the ruin of their empire by Charles the Great, as related under the article FRANCE, n° 21. As the Lombards, however, had not been possessed of the whole territory of Italy, so the whole of it never came into the possession of Charlemagne: neither, since the time of the Goths, hath the whole of this country been under the dominion of any single state. Some of the southern provinces were still possessed by the emperors of Constantinople; and the liberal grants of Pepin and Charlemagne himself to the pope, had invested him with a considerable share of temporal power. The territories of the pope indeed were supposed to be held in vassalage from France; but this the popes them-

33
Subdued by
Charles-
magne.

Italy.

34
extent of
his Italian
dominions

selves appeared stiffly denied. The indisputed territory of Charlemagne in Italy, therefore, was restricted to Piedmont, the Milanese, the Mantuan, the territory of Genoa, Parma, Modena, Tuscany, Bologna, the dukedoms of Friuli, Spoleto, and Benevento; the last of which contained the greatest part of the present kingdom of Naples.

The feudal government which the Lombards had introduced into Italy, naturally produced revolts and commotions, as the different dukes inclined either to change their masters, or to set up for themselves. Several revolts indeed happened during the life of Charlemagne himself; which, however, he always found means to crush: but after his death, the sovereignty of Italy became an object of contention between the kings of France and the emperors of Germany. That great monarch had divided his extensive dominions among his children; but they all died during his lifetime, except Lewis, whom he associated with himself in the empire, and who succeeded to all his dominions after his death. From this time we may date the troubles with which Italy was so long overwhelmed; and of which, as they proceeded from the ambition of those called kings of Italy and their nobles, of the kings of France, and of the emperors of Germany, it is difficult to have any clear idea. The following short sketch, however, may perhaps give some satisfaction on this perplexed subject.

35
history of
the distur-
bances in I-
taly after
the time of
Charle-
magne.

At the time Lewis the son of Charlemagne was declared emperor of the West, Italy was held by Bernard the son of Pepin, brother to Lewis. Though this Bernard bore the title of *king*, yet he was only accounted a vassal of the emperor. His ambition, however, soon prompted him to rebel against his uncle; but being abandoned by his troops, he was taken prisoner, had his eyes pulled out, and died three days after. As the disturbances still continued, and the nobles of Lombardy were yet very refractory, Lothaire, eldest son to the emperor, was, in the year 823, sent into Italy; of which country he was first crowned king at Rome, and afterwards emperor of the West, during his father's life-time. But though his abilities were sufficient to have settled every thing in a state of tranquillity, his unbounded ambition prompted him to engage in rebellion against his father; whom he more than once took prisoner; though in the end he was obliged to submit, and ask pardon for his offences, which was obtained only on condition of his not passing the Alps without leave obtained from his father.

In the mean time, the Saracens, taking advantage of these intestine wars, landed on the coasts of Italy, and committed such ravages, that even the bishops were obliged to arm themselves for the defence of the country. Lothaire, however, after returning from his unnatural war with his father, was so far from attempting to put an end to these ravages, or to restore tranquillity, that he seized on some places belonging to the see of Rome, under pretence that they were part of his kingdom of Lombardy; nor would he forbear these encroachments, till expressly commanded to do so by his father. After having embroiled himself, and almost lost all his dominions, in a war with his brothers after the death of Lewis, and declared his son, also called *Lewis*, king of Italy, this ambitious prince

died, leaving to Lewis the title of *emperor*, as well as *king of Italy*, with which he had before invested him.

The new emperor applied himself to the restoration of tranquillity in his dominions, and driving out the Saracens from those places which they had seized in Italy. This he fully accomplished, and obliged the infidels to retire into Africa; but in 875, he died, without naming any successor. After his death, some of the Italian nobles, headed by the duke of Tuscany, represented to the pope, that as Lewis had left no successor, the regal dignity, which had so long been usurped by foreigners, ought now to return to the Italians. The pope, however, finding that Charles the Bald, king of France, had such an ambition for the imperial crown, that he would stick at nothing to obtain it, resolved to gratify him, though at as high a price as possible. He accordingly crowned him emperor and king of Lombardy, on condition of his owning the independency of Rome, and that he himself only held the empire by the gift of the pope. This produced a conspiracy among the discontented nobles; and at the same time the Saracens, renewing their incursions, threatened the ecclesiastical territories with the utmost danger. The pope solicited the emperor's assistance, with the greatest earnestness; but he died before any thing effectual could be done: after which, being distressed by the Saracens on one hand, and the Lombard nobles on the other, the unhappy pontiff was forced to fly into France. Italy now fell into the utmost confusion and anarchy; during which time many of the nobles and states of Lombardy assumed an independency, which they have ever since retained.

In 879, the pope was reconducted to Italy with an army by Boson son-in-law to Lewis II. of France: but though he inclined very much to have raised this prince to the dignity of king of Italy, he found his interest insufficient for that purpose, and matters remained in their former situation. The nobles, who had driven out the pope, were now indeed reconciled to him: but notwithstanding this reconciliation, the state of the country was worse than ever; the great men renouncing the authority of any superior, and every one claiming to be sovereign in his own territories. To add to the calamities, which ensued through the ambition of these despots, the Saracens committed every where the most terrible ravages; till at last the Italian nobles, despising the kings of the Carolingian race, who had weakened themselves by their mutual dissensions, began to think of throwing off even all nominal submission to a foreign yoke, and retaining the imperial dignity among themselves. Thus they hoped, that, by being more united among themselves, they might be more able to resist the common enemy. Accordingly, in 885, they went to pope Adrian, and requesting him to join them in asserting the independency of Italy, they obtained of him the two following decrees, viz. That the popes, after their election, might be consecrated without waiting for the presence of the king or his ambassadors; and that, if Charles the Great died without sons, the kingdom of Italy, with the title of *emperor*, should be conferred on some of the Italian nobles.

These decrees were productive of the worst consequences imaginable. The emperor complained of be-
ing

Italy.

ing deprived of his right; and the dissensions between the Italian nobles themselves became more fatal than ever. The two most powerful of these noblemen, Berengarius duke of Friuli, and Guido or Vido duke of Spoleto, entered into an agreement, that, on the death of the emperor, the former should seize on the kingdom of Italy, and the latter on the kingdom of France. Berengarius succeeded without opposition, but Vido was disappointed, the French having already chosef Endes or Otho for their king. Upon this he returned to Italy, and turned his arms against Berengarius. Vido proved victorious in an engagement, and drove his rival into Germany; where he fought the assistance of Arnolphus, who had succeeded to the crown after the death of Charles. Having thus obtained the kingdom of Italy, Vido employed his time in reforming the abuses of the state, and confirming the grants formerly given to the pope out of gratitude for his having sanctified his usurpation and declared him lawful king of Italy. This tranquillity, however, was of short duration. Arnolphus sent an army into Italy; the Saracens from Spain ravaged the northern parts of the country, and, getting possession of a castle near the Alps, held it for many years after, to the great distress of the neighbouring parts, which were exposed to their continual incursions; and at the same time Benevento was besieged and taken by the forces of the eastern emperor, so that Vido found his empire very considerably circumscribed in its dimensions.

The new king, distressed by so many enemies, associated his son Lambert with him in the government, and bribed the Germans to return to their own country. In 893, however, they again invaded Italy; but were suddenly obliged to leave the country, after having put Berengarius in possession of Pavia. In the mean time, Vido died, and his son Lambert drove out Berengarius: but having joined a faction, headed by one Sergius, against pope Formosus, the latter offered the kingdom of Italy to Arnolphus; who thereupon entered the country with an army, besieged and took Rome, massacring the faction of Sergius with the most unrelenting cruelty.

Arnolphus thus master of Italy, and crowned emperor by the pope, began to form schemes of strengthening himself in his new acquisitions by putting out eyes of Berengarius: but the latter, having timely notice of this treachery, fled to Verona; and the Italians, were so provoked at this and the other cruelties of Arnolphus, that they drove him out of the country. His departure occasioned the greatest confusion at Rome. Formosus died soon after; and the successors to the papal dignity, having now no army to fear, excited the greatest disturbances. The body of Formosus was dug up and thrown into the Tiber by one pope, while that pope was strangled, and Formosus's body buried again in the Vatican, by order of another. At last the coronation of Arnolphus was declared void, the Sergian faction entirely demolished, and the abovementioned decrees of Adrian annulled; it being now determined that the elected popes should not be consecrated but in presence of the emperor or his ambassadors.

During these confusions Lambert enjoyed the kingdom in quiet; but the nobles, hating him on account of his arbitrary and tyrannical government, began

again to think of Berengarius. In the mean time, however, another faction offered the crown to Lewis king of Arles. This new competitor entered Italy with an army in 899; but was forced by Berengarius to renounce his claim upon oath, and to swear, that he would never again enter Italy, even though he should be invited to be crowned emperor.—This oath, however, was soon forgot. Lewis readily accepted of another invitation, and was crowned king of Italy at Pavia in 901. The following year he forced Berengarius to fly into Bavaria; but having unadvisedly disbanded his army, as thinking himself now securely seated on the throne, Berengarius, who watched every opportunity, surprised him at Verona, and put out his eyes.

Thus Berengarius at last became king of Italy without a rival; and held his kingdom for 20 years afterwards, without any opposition from his subjects, who at last became sensible of the mischiefs arising from civil discords. He was not yet, however, without troubles. The Hungarians invaded Italy with a formidable army, and advanced within a small distance of Pavia. Berengarius armed the whole force of his dominions; and came against them with such a multitude, that the Hungarians retired without venturing an engagement. A great many of their men were lost in passing a river; upon which they sent deputies to Berengarius, offering to restore all their booty, and never to come again into Italy, provided they were allowed a safe retreat. These conditions were imprudently denied; upon which the Hungarians attacked the army of Berengarius in despair, and defeated them with great slaughter. After this they over-ran the whole country, and plundered the towns of Treviso, Vicenza, and Padua, without resistance, the inhabitants flying every where into fortified places. This devastation they continued for two years; nor could their departure be procured without paying them a large sum of money: which, however, proved of little avail; for the following year they returned, and ravaged the territory of Friuli without controul. Scarcely were these invaders departed, when the Saracens, who had settled at the foot of the Alps, invaded Apulia and Calabria, and made an irruption as far as Acqui in the neighbourhood of Pavia; while the inhabitants, instead of opposing them, fled to some forts which had been erected in the time of the first irruption of the Hungarians. In 912, however, John, presbyter of Ravenna, having attained the papal dignity by means of Theodora, wife of Adelbert count of Tuscany, applied himself to regulate the affairs of the church, and to repress the insults of the Saracens. While he was considering on the most proper methods of effecting this, one of the Saracens, who had received an injury from his countrymen, fled to Rome, and offered to deliver the Italians from their invasions, if the Pope would but allow him a small body of men. His proposals being accepted, 60 young men were chosen, all well armed; who being conducted by the Saracen into by-paths, attacked the infidels as they were returning from their inroads, and several times defeated great parties of them. These losses affecting the Saracens, a general alliance was concluded amongst all their cities; and having fortified a town on the Garigliano, they abandoned the rest,

Italy.

rest, and retired thither. Thus they became much more formidable than before; which alarming the pope, he consulted with Atenulphus prince of Benevento and Capua, sending at the same time ambassadors to Constantine the Greek emperor, inviting him to an alliance against the infidels. The Saracens, unable to withstand such a powerful combination, were besieged in their city: where being reduced to great straits, they at last set fire to it, and sallied out into the woods; but being pursued by the Italians, they were all cut off to a man.

In this expedition it is probable that Berengarius gave great assistance; for this very year, 915, he was crowned emperor by the pope. This gave displeasure to many of the ambitious nobles; conspiracies were repeatedly formed against him; in 922, Rodolphus king of Burgundy was crowned sole king of Italy; and in 924, Berengarius was treacherously assassinated at Verona; of which disturbances, the Hungarians taking the advantage, plundered the cities of Mantua, Brescia, and Bergamo. Marching afterwards to Pavia, they invested it closely on all sides; and about the middle of March 925, taking advantage of the wind, they set fire to the houses next the walls, and during the confusion broke open the gates, and, getting possession of the city, treated the inhabitants with the greatest barbarity. Having burnt the capital of the kingdom, they next proceeded to Placenza, where they plundered the suburbs; and then returned to Pannonia, laden with booty.

The affairs of Italy now fell into the utmost confusion. A faction was formed against Rodolphus in favour of Hugh count of Arles. The latter prevailed, and was crowned king at Pavia in 927. The Italians, however, soon repented of their choice. The Romans first invited him to be their governor, and then drove him out with disgrace; at the same time choosing a consul, tribunes, &c. as if they had designed to assert their ancient liberty. One faction, in the mean time, offered the crown to Rodolphus, and the other to Arnold duke of Bavaria, while the Saracens took this opportunity to plunder the city of Genoa.

Hugh, in the mean time, was not inactive. Having collected an army, he marched directly against Arnold, and entirely defeated him. Rodolphus delivered him from all apprehensions on his part, by entering into an alliance with him, and giving his daughter Adelaide in marriage to Lotharius, Hugh's son. Being thus free from all danger from foreign enemies, he marched against the Romans; but with them he also came to an agreement, and even gave his daughter in marriage to Alberic, whom they had chosen consul. In the mean time the country was infested by the Hungarians and Saracens, and at the same time depopulated by a plague. Endless conspiracies were formed against Hugh himself; and at last, in 947, he was totally deprived of the regal power by Berengarius, grandson to the first king of that name; soon after which he retired into Burgundy, and became a monk.

Though Berengarius was thus possessed of the supreme power, he did not assume the title of king till after the death of Lotharius, which happened in 950; but, in the mean time, Italy was invaded by Henry duke of Bavaria, and the Hungarians. The former

Vol. V.

took and plundered the city of Aquileia, and ravaged the neighbouring country; after which he returned without molestation into Germany: the latter made a furious irruption, and Berengarius being unable to oppose them, was at last obliged to purchase their departure by money. In raising the sum agreed upon, however, Berengarius is said to have been more oppressive than even the Hungarians themselves. Every individual, without distinction of age or sex, was obliged to pay so much for their head; not excepting even the poor. The churches were likewise robbed; by which means the king raised an immense sum of money, 10 bushels of which he gave to the Hungarians, but kept the much greater part to himself.

Berengarius, not yet satisfied, wanted to be put in possession of Pavia, which was held by Adelaide, the widow of Lotharius. In order to obtain his purpose, he proposed a marriage between her and his son Adelbert. This proposal was rejected; upon which Berengarius besieged and took the city. The queen was confined in a neighbouring castle, from whence she made her escape by a contrivance of her confessor. With him, and one female attendant, she concealed herself for some days in a wood; but, being obliged to remove from thence for want of food, she applied for protection to Adelard bishop of Reggio. By him she was recommended to his uncle Atho, who had a strong castle in the neighbourhood of Canzoa. Here she was quickly besieged by Berengarius; upon which messengers were dispatched to Otho king of Germany, acquainting him, that, by expelling Berengarius, and marrying Adelaide, he might easily obtain the kingdom of Italy. This proposal he readily accepted, and married Adelaide; but allowed Berengarius to retain the greatest part of his dominions, upon condition of his doing homage for them to the kings of Germany. He deprived him, however, of the dukedom of Friuli, and marquise of Verona, which he gave to Henry duke of Bavaria.

Berengarius thus freed from all apprehension, not only oppressed his subjects in a most tyrannical manner, but also revolted against Otho himself. This at last procured his ruin: for, in 961, Otho returned with an army into Italy, where he was crowned king by the archbishop of Milan; and the year following was crowned emperor by the pope. On this occasion he received the imperial crown from his holiness, and killed his feet with great humility: after which they both went to the altar of St Peter, and bound themselves by a solemn oath, the pope to be always faithful to the emperor, and to give no assistance to Berengarius or Adelbert his enemies; and Otho, to consult the welfare of the church, and to restore to it all its patrimony granted by former emperors. Otho, besides this, bestowed very rich presents on the church of St Peter. He ordained that the election of popes should be according to the canons; that the elected pope should not be consecrated till he had publicly promised, in presence of the emperor's commissaries, to observe every thing formerly specified with regard to the rights of the emperors; that these commissaries should constantly reside at Rome, and make a report every year how justice was administered by the judges; and, in case of any complaints, the commissaries should lay them before the pope; but if he neglected to intimate them, the

22 P

imperial

Italy.

37
Italy oppressed by the Hungarians and Berengarius.

36
Pavia plundered and burnt by the Hungarians.

38
Otho crowned king of Italy and emperor of the west.

Italy. imperial commissaries might then do what they pleased.

Thus we see that Otho, however much he might allow the pope's supremacy in spiritual matters, plainly assumed the sovereignty in temporal to himself; and thus Italy was for upwards of 300 years accounted a part of the German empire. The popes, however, by no means relished this superiority of the emperor. The latter was hardly departed, when the pope (John XII.) broke the oath which he had just before sworn with so much solemnity; and entered first into an alliance with Adelbert count of Tuscany to expel the Germans, and then solicited the Hungarians to invade Italy. This treachery was soon punished by Otho. He returned with part of his army, and assembled a council of bishops. As the pope did not appear, Otho pretended great concern for his absence. The bishops replied, that the consciousness of his guilt made him afraid to shew himself. The emperor then inquired particularly into his crimes; upon which the bishops accused him of filling the palace with lewd women, of ordaining a bishop in a stable, castrating a cardinal, drinking the devil's health, &c. As the pope still refused to appear in order to justify himself from these charges, he was formally deposed; and Leo the chief secretary, though a layman, elected in his stead.

39
He deposes
the pope.

The new pope, in compliment to the emperor, granted a bull, by which it was ordained that Otho and his successors should have a right of appointing the popes and investing archbishops and bishops; and that none should dare to consecrate a bishop without leave obtained from the emperor. Thus were the affairs of the Italians still kept in the utmost confusion even during the reign of Otho I. who appears to have been a wise and active prince. He was no sooner gone, than the new pope was deposed, all his decrees annulled, and John replaced. The party of Leo was now treated with great cruelty: but John was soon stopped in his career; for about the middle of May the same year (964) in which he had been restored, being surprised in bed with a Roman lady, he received a blow on the head from the devil (according to the authors of those times) of which he died eight days after. After his death a cardinal-deacon, named *Benedict*, was elected by the Romans, but deposed by Otho, and banished to Hamburg.

40
The Ita-
lians revolt,
but are re-
duced.

The emperor was scarce returned to Germany, when his sickle Italians revolted, and sent for Adelbert who had fled to Corsica. But being soon reduced, they continued quiet for about a year; after which they revolted again, and imprisoned the pope. Otho, however, provoked at their rebellious disposition, soon returned, and punished the rebels with great severity; after which he made several laws for the better regulation of the city of Rome, granted several privileges to the Venetians, and caused his son Otho, then only 13 years of age, to be crowned emperor.

This ceremony being over, Otho dispatched an ambassador to Nicephorus, emperor of Constantinople, demanding his step-daughter Theophania in marriage for the young emperor; but upon this alliance being rejected, and that not without circumstances of the most atrocious perfidy, Otho instantly invaded the countries of Apulia and Calabria, and entirely defeated

the Greek army in those parts. In the mean time, however, Nicephorus being killed, and his throne usurped by John Zimisceus, Otho immediately entered into an alliance with the latter, and easily obtained Theophania for his son. She was crowned with great solemnity on the 8th of April 969: at the same time it is pretended by some authors, that the Greeks renounced their rights to Calabria and Apulia; though this is denied by others. After the celebration of this marriage, the emperor undertook an expedition against the Saracens, who still resided at the foot of the Alps; but being informed of the death of several nobles in Germany, he thought proper to return thither, where he died of an apoplexy in the year 973.

41
State of
Italy at the
death of
Otho.

At the time of Otho's death Italy was divided into the provinces of Apulia, Calabria, the dukedom of Benevento, Campania, Terra Romana, the dukedom of Spoleto, Tuscany, Romagna, Lombardy, and the marquises of Acona, Verona, Friuli, Treviso, and Genoa. Apulia and Calabria were still claimed by the Greeks; but all the rest were either immediately subject to, or held of, the kings of Italy. Otho conferred Benevento (including the ancient Samnium) on the duke of that name. Campania and Lucania he gave to the dukes of Capua, Naples, and Salerno. Rome with its territory, Ravenna with the exarchate, the dukedom of Spoleto, with Tuscany, and the marquise of Ancona, he granted to the pope; and retained the rest of Italy under the form of a kingdom. Some of the cities were left free, but all tributary. He appointed several hereditary marquises and counties, but reserved to himself the sovereign jurisdiction in their territories. The liberty of the cities consisted in a freedom to choose their own magistrates, to be judged by their own laws, and to dispose of their own revenues, on condition that they took the oath of allegiance to the king, and paid the customary tribute. The cities that were not free were governed by the commissaries, or lieutenants of the emperor; but the free cities were governed by two or more consuls, afterwards called *podestates*, chosen annually, who took the oath of allegiance to the emperor, before the bishop of the city, or the emperor's commissary. The tribute exacted was called *foderum, parata, et mansuetudine*. By the *foderum* was meant a certain quantity of corn which the cities were obliged to furnish to the king, when marching with an army, or making a progress through the country; though the value of this was frequently paid in money. By the *parata* was understood the expence laid out in keeping the public roads and bridges in repair; and the *mansuetudine* included those expences which were required for lodging the troops, or accommodating them in their camp. Under pretence of this last article the inhabitants were sometimes stripped of all they possessed, except their oxen, and feed for the land. Besides regulating what regarded the cities, Otho distributed honours and possessions to those who had served him faithfully. The honours consisted in the titles of *duke, marquis, count, captain, vavasor, and valvasin*; the possessions were, besides land, the duties arising from harbours, ferries, roads, fish-ponds, mills, salt-pits, the uses of rivers, and all pertaining to them, and such like. The dukes, marquises, and counts, were those who received dukedoms, marquises, and coun-

ties,

Italy.

ties, from the king in fiefs; the captains had the command of a certain number of men by a grant from the king, duke, marquis, or count; the valvafors were fubordinate to the captains, and the valvafins to them.

42
Great di-
urbances
happen on
the death of
Otho I.

No fooner was the death of Otho I. known in Italy, than, as if they had been now freed from all reſtraint, the nobles declared war againſt each other: ſome cities revolted, and choſe to themſelves conſuls; while the dominions of others were ſeized by the nobles, who confirmed their power by erecting citadels. Rome eſpecially was haraſſed by tumults, occaſioned chiefly by the ſeditious practices of one Cincius, who preſſed his fellow-citizens to reſtore the ancient republic. As the pope continued firm in the intereſts of the emperor, Cincius cauſed him to be ſtrangled by one Franco a cardinal deacon; who was ſoon after rewarded with the pontificate, and took upon him the name of *Boniface VII.* Another Pope was choſen by the faction of the count of Tufcany; who being approved by the emperor, drove Cincius and Boniface out of the city. Diſturbances of a ſimilar kind took place in other cities, though Milan continued quiet and loyal in the midſt of all this uproar and conſuſion.

In the mean time Boniface fled for refuge to Conſtantinople, where he excited the emperor to make war againſt Otho II. In 979 an army was accordingly ſent into Italy, which conquered Apulia and Calabria; but the next year Otho entered Italy with a formidable army, and, having taken a ſevere revenge on the authors of the diſturbances, drove the Greeks entirely out of the provinces they had ſeized. Having then cauſed his ſon Otho III. at that time a boy of ten years of age, to be proclaimed emperor, he died at Rome in the year 983. Among the regulations made by this emperor, one is very remarkable, and muſt give us a ſtrange idea of the inhabitants of Italy at that time. He made a law, That no Italian ſhould be believed upon his oath; and that in any diſpute which could not be decided otherwiſe than by witneſſes, the parties ſhould have recourſe to a duel.

Otho III. ſucceeded to the empire at twelve years of age; and, during his minority, the diſturbances in Italy revived. Cincius, called alſo *Crefcentius*, renewed his ſcheme of reſtoring the republic. The pope (John XV.) oppoſing his ſchemes, was driven out of the city; but was ſoon after recalled, on hearing that he had applied to the emperor for aſſiſtance. A few years after Crefcentius again revolted, and expelled Gregory V. the ſucceſſor of John XV.; raiſing to the papal dignity a creature of his own, under the name of *John XVI.* Otho, enraged at this inſult, returned to Rome with a powerful army in 998, beſieged and took it by aſſault; after which he cauſed Crefcentius to be beheaded, and the pope he had ſet up to be thrown headlong from the caſtle of St Angelo, after having his eyes pulled out, and his noſe cut off. Four years after, he himſelf died of the ſmall-pox; or, according to ſome, was poiſoned by the widow of Crefcentius, whom he had debauched under a promiſe of marriage, juſt as he was about to puniſh the Romans for another revolt.

Otho was ſucceeded in the imperial throne by Henry duke of Bavaria, and grandſon to Otho II. Henry had no ſooner ſettled the affairs of Germany, than he

Italy.

found it neceſſary to march into Italy againſt Ardouin marquis of Ivrea, who had aſſumed the title of *King of Italy.* Him he defeated in an engagement, and was himſelf crowned king of Italy at Pavia in 1005; but, a few years after, a new conteſt aroſe about the papal chair, which again required the preſence of the emperor. Before he arrived, however, one of the competitors (*Benedict VIII.*) had got the better of his rival, and both Henry and his queen received the imperial crown from his hands. Before the emperor entered the church, the pope propoſed to him the following queſtion: "Will you obſerve your fidelity to me and my ſucceſſors in every thing?" To which, tho' a kind of homage, he ſubmitted, and answered in the affirmative. After his coronation, he confirmed the privileges beſtowed on the Roman ſee by his predeceſſors, and added ſome others of his own; ſtill, however, reſerving for himſelf the ſovereignty and the power of ſending commiſſaries to hear the grievances of the people. Having repelled the incuſions of the Saracens, reduced ſome more rebellions of his ſubjects, and reduced the greateſt part of Apulia and Calabria, he died in the year 1024.

The death of this emperor was, as uſual, followed by a competition for the crown. Conrad being choſen emperor of Germany, was declared king of Italy by the archbiſhop of Milan; while a party of the nobles made offer of the crown to Robert king of France, or his ſon Hugh. But this offer being declined, and likewiſe another to William duke of Guienne, Conrad enjoyed the dignity conferred on him by the archbiſhop without moleſtation. He was crowned king of Italy at Monza, in 1026; and the next year he received the imperial crown from pope John XX. in preſence of Canute the Great, king of England, Denmark, and Norway, and Rodolph III. king of Burgundy. His reign was ſimilar to that of his predeceſſors. The Italians revolted, the pope was expelled, the malcontents were ſubdued, and the pope reſtored; after which the emperor returned to Germany, and died in 1039.

Under Henry III. who ſucceeded Conrad, the di-
ſturbances were prodigiouſly augmented. Pope Syl-
vester II. was driven out by Benedict; who in his
turn was expelled by John biſhop of Sabinum, who
aſſumed the title of *Sylveſter III.* Three months af-
ter, Benedict was reſtored, and excommunicated his ri-
vals; but ſoon after reſigned the pontificate for a ſum
of money. In a ſhort time he reclaimed it; and thus
there were at once three popes, each of whom was
ſupported on a branch of the papal revenue, while all
of them made themſelves odious by the ſcandalous lives
they led. At laſt a prieſt called *Gratian* put an end
to this ſingular triumvirate. Partly by artifice, and
partly by preſents, he perſuaded all the three to
renounce their pretentions to the papacy; and the
people of Rome, out of gratitude for ſo ſignal a ſer-
vice to the church, choſe him pope, under the name
of *Gregory VI.* Henry III. took umbrage at this
election, in which he had not been conſulted, and
marched with an army into Italy. He depoſed Gre-
gory, as having been guilty of ſimony; and filled the
papal chair with his own chancellor, Heidiger, biſhop
of Bamberg, who aſſumed the name of *Clement II.*
and afterwards conſecrated Henry and the empreſs
Agnes.

43
Rome
taken by
Otho III.

45
He invests
the Nor-
mans with
some terri-
tories in
Apulia and
Calabria.

Agnes. This ceremony being over, and the Romans having sworn never to elect a pope without the approbation of the reigning emperor, Henry proceeded to Capua, where he was visited by Drago, Rainulphus, and other Norman adventurers; who, leaving their country at different times, had made themselves masters of great part of Apulia and Calabria, at the expense of the Greeks and Saracens. Henry entered into treaty with them; and not only solemnly invested them with those territories which they had acquired by conquest, but prevailed on the pope to excommunicate the Beneventines, who had refused to open their gates to him, and bestowed that city and its dependencies, as fiefs of the empire, upon the Normans, provided they took possession by force of arms. The emperor was scarce returned to Germany, when he received intelligence of the death of Clement II. He was succeeded in the apostolic see by Damasus II.; who also dying soon after his elevation, Henry nominated Bruno bishop of Toul, to the vacant chair. This Bruno, who was the emperor's relation, immediately assumed the pontificals; but being a modest and pious prelate, he threw them off on his journey, by the persuasion of a monk of Cluny, named Hildebrand, afterwards the famous Gregory VII. and went to Rome as a private man. "The emperor alone," said Hildebrand, "has no right to create a pope." He accompanied Bruno to Rome, and secretly retarded his election, that he might arrogate to himself the merit of obtaining it. The scheme succeeded to his wish: Bruno, who took the name of *Leo IX.* believing himself indebted to Hildebrand for the pontificate, favoured him with his particular friendship and confidence; and hence originated the power of this enterprising monk, of obscure birth, but boundless ambition, who governed Rome so long, and whose zeal for the exaltation of the church occasioned so many troubles to Europe.

Leo, soon after his elevation, waited on the emperor at Worms, to crave assistance against the Norman princes, who were become the terror of Italy, and treated their subjects with great severity. Henry furnished the Pope with an army; at the head of which he marched against the Normans, after having excommunicated them, accompanied by a great number of bishops and other ecclesiastics, who were all either killed or taken prisoners, the Germans and Italians being totally routed. Leo himself was led captive to Benevento, which the Normans were now masters of, and which Henry had granted to the pope in exchange for the fief of Bamberg in Germany; and the apostolic see is to this day in possession of Benevento, by virtue of that donation. The Normans, however, who had a right to the city by a prior grant, restored it, in the mean time, to the princes of Lombardy; and Leo was treated with so much respect by the conquerors, that he revoked the sentence of excommunication, and joined his sanction to the imperial investiture for the lands which they held in Apulia and Calabria. Leo died soon after his release; and the emperor, about the same time, caused his infant son, afterwards the famous Henry IV. to be declared king of the Romans, a title still in use for the acknowledged heir of the empire. Gebhard, a German bishop, was elected pope, under the name of *Victor II.* and confirmed

46
Henry IV.
declared
king of the
Romans.

by the address of Hildebrand, who waited on the emperor in person for that purpose, though he disdained to consult him beforehand. Perhaps Hildebrand would not have found this task so easy, had not Henry been involved in a war with the Hungarians; who pressed him hard, but whom he obliged at last to pay a large tribute, and furnish him annually with a certain number of fighting men.

As soon as the emperor had finished this war, and others to which it gave rise, he marched into Italy to inspect the conduct of his sister Beatrice, widow of Boniface marquis of Mantua, and made her prisoner. She had married Gozelo, duke of Lorraine, without the emperor's consent; and contracted her daughter Matilda, by the marquis of Mantua, to Godfrey duke of Spoleto and Tuscany, Gozelo's son by a former marriage. This formidable alliance justly alarmed Henry: he therefore attempted to dissolve it, by carrying his sister into Germany, where he died soon after his return, in the 39th year of his age, and the 16th of his reign.

This emperor, in his last journey to Italy, concluded an alliance with Contarini, doge of Venice. That republic was already rich and powerful, though it had only been enfranchised in the year 998, from the tribute of a mantle of cloth of gold, which it formerly paid, as a mark of subjection, to the emperors of Constantinople. Genoa was the rival of Venice in power and in commerce, and was already in possession of the island of Corsica, which the Genoese had taken from the Saracens. These two cities ingrossed at this time almost all the trade of Europe. There was no city in any respect equal to them either in France or Germany.

Henry IV. was only five years old at his father's death. The popes made use of the respite given them by his minority, to shake off in a great measure their dependence upon the emperors. After a variety of contests about the pontificate, Nicholas II. a creature of Hildebrand's, was elected; who, among others, passed the following celebrated decree, viz. That, for the future, the cardinals only should elect the pope; and that the election should afterwards be confirmed by the rest of the clergy and the people, "saving the honour (adds he) due to our dear son Henry, now king; and who, if it please God, shall be one day emperor, according to the right which we have already conferred upon him." After this he entered into a treaty with the Norman princes above-mentioned; who, though they had lately sworn to hold their possessions from the emperor, now swore to hold them from the pope; and hence arose the pope's claim of sovereignty over the kingdom of Naples and Sicily.

Thus was the power of the German emperors in Italy greatly diminished, and that of the popes proportionally exalted; of which Henry soon had sufficient evidence. For, having assumed the government into his own hands in the year 1072, being then 22 years of age, he was summoned by Alexander II. to appear before the tribunal of the holy see, on account of his loose life, and to answer the charge of having exposed the investiture of bishops to sale; at the same time that the pope excited his German subjects to rebel against him. The rebels, however, were defeated, and peace was restored to Germany: but soon after, Hildebrand above-mentioned, being elected

47
Increase of
the pope's
power.

49
His contest
with the
emperor.

to.

Italy.

to the pontificate under the name of *Gregory VII.* openly assumed the superiority over every earthly monarch whatever. He began with excommunicating every ecclesiastic who should receive a benefice from the hands of a layman, and every layman who should take upon him to confer such a benefice. Henry, instead of resenting this insolence, submitted, and wrote a penitential letter to the pope: who, upon this, condescended to take him into favour, after having severely reprimanded him for his loose life; of which the emperor now confessed himself guilty.

The quarrel between the church and the emperor was, however, soon brought to a crisis by the following accident. Solomon, king of Hungary, being deposed by his brother Geysa, had fled to Henry for protection, and renewed the homage of Hungary to the empire. Gregory, who favoured Geysa, exclaimed against this act of submission, and said in a letter to Solomon, "You ought to know that the kingdom of Hungary belongs to the Roman church; and learn that you will incur the indignation of the holy see, if you do not acknowledge that you hold your dominions of the pope and not of the emperor." Henry, though highly provoked at this declaration, thought proper to treat it with neglect; upon which Gregory resumed the dispute about investitures. The predecessors of Henry had always enjoyed the right of nominating bishops and abbots, and of giving them investiture by the cross and the ring. This right they had in common with almost all princes. The predecessors of Gregory VII. had been accustomed, on their part, to send legates to the emperors, in order to treat their assistance, to obtain their confirmation, or desire them to come and receive the papal sanction; but for no other purpose. Gregory, however, sent two legates to summon Henry to appear before him as a delinquent, because he still continued to bestow investitures, notwithstanding the apostolic decree to the contrary; adding, that if he should fail to yield obedience to the church, he must expect to be excommunicated and dethroned. Incensed at this arrogant message from one whom he considered as his vassal, Henry dismissed the legates with very little ceremony, and in 1706 convoked an assembly of all the princes and dignified ecclesiastics at Worms; where, after mature deliberation, they concluded, that Gregory having usurped the chair of St Peter by indirect means, infected the church of God with a great many novelties and abuses, and deviated from his duty to his sovereign in several scandalous attempts, the emperor, by that supreme authority derived from his predecessors, ought to divest him of his dignity, and appoint another in his place. In consequence of this determination, Henry sent an ambassador to Rome, with a formal deprivation of Gregory; who, in his turn, convoked a council, at which were present 110 bishops, who unanimously agreed that the pope had just cause to depose Henry, to dissolve the oath of allegiance which the princes and states had taken in his favour, and to prohibit them from holding any correspondence with him on pain of excommunication, which was immediately fulminated against the emperor and his adherents.

"In the name of Almighty God, and by our authority, (said Gregory), I prohibit Henry, the son of our emperor Henry, from governing the Teutonic

kingdom, and Italy: I release all Christians from their oath of allegiance to him; and strictly forbid all persons from serving or attending him as king!" The circular letters written by this pontiff breathe the same spirit with his sentence of deposition. He there repeats, several times, that "bishops are superior to kings, and made to judge them?" expressions alike artful and presumptuous, and calculated for bringing in all the churchmen of the world to his standard.

Gregory knew well what consequences would follow the thunder of the church. The German bishops came immediately over to his party, and drew along with them many of the nobles: the flame of civil war still lay smothering, and a bull properly directed was sufficient to set it in a blaze. The Saxons, Henry's old enemies, made use of the papal displeasure as a pretence for rebelling against him. Even Guelph, to whom the emperor had given the duchy of Bavaria, supported the malcontents with that power which he owed to his sovereign's bounty: nay, those very princes and prelates who had assisted in deposing Gregory, gave up their monarch to be tried by the pope; and his holiness was solicited to come to Augsbourg for that purpose.

Willing to prevent this odious trial at Augsbourg, Henry took the unaccountable resolution of suddenly passing the Alps at Tirol, accompanied only by a few domestics, to ask absolution of pope Gregory his oppressor; who was then in Canzoza, on the Appennine mountains; a fortress belonging to the counts or dukes Matilda, abovementioned. At the gates of this place the emperor presented himself as an humble penitent. He alone was admitted without the outer court; where, being stripped of his robes, and wrapped in sack-cloth, he was obliged to remain three days, in the month of January, bare-footed and fasting, before he was permitted to kiss the feet of his holiness; who all that time was shut up with the devout Matilda, whose spiritual director he had long been, and, as some say, her gallant. But be that as it may, her attachment to Gregory, and her hatred to the Germans, was so great, that she made over all her estates to the apostolic see; and this donation is the true cause of all the wars which since that period have raged between the emperors and the popes. She possessed in her own right, great part of Tuscany, Mantua, Parma, Reggio, Placentia, Ferrara, Modena, Verona, and almost the whole of what is now called the *patriarchy of St Peter*, from Viterbo to Orvieto; together with part of Umbria, Spoleto, and the Marche of Ancona.

The emperor was at length permitted to throw himself at the pontiff's feet; who condescended to grant him absolution, after he had sworn obedience to him in all things, and promised to submit to his solemn decision at Augsbourg: so that Henry got nothing but disgrace by his journey; while Gregory, elated by his triumph, and now looking upon himself (not altogether without reason) as the lord and master of all the crowned heads in Christendom, said in several of his letters, that it was his duty "to pull down the pride of kings."

This extraordinary accommodation gave much disgust to the princes of Italy. They never could forgive the insolence of the pope, nor the abject humility of the emperor. Happily however for Henry, their indignation

Italy.

57
Who is at
last obliged
to submit.

49

The emperor
deposes
the pope.

50

And he the
emperor.

dignation at Gregory's arrogance overbalanced their detestation of his meanness. He took advantage of this temper; and by a change of fortune, hitherto unknown to the German emperors, he found a strong party in Italy, when abandoned in Germany. All Lombardy took up arms against the pope, while he was raising all Germany against the emperor. Gregory, on the other hand, made use of every art to get another emperor elected in Germany; and Henry, on his part, left nothing undone to persuade the Italians to elect another pope. The Germans chose Rhodolph, duke of Suabia, who was solemnly crowned at Mentz; and Gregory, hesitating on this occasion, behaved truly like the supreme judge of kings. He had deposed Henry, but still it was in his power to pardon that prince: he therefore affected to be displeased that Rodolph was consecrated without his order; and declared, that he would acknowledge as emperor and king of Germany, him of the two competitors who should be most submissive to the holy see.

Henry, however, trusting more to the valour of his troops, than to the generosity of the pope, set out immediately for Germany, where he defeated his enemies in several engagements: and Gregory, seeing no hopes of submission, thundered out a second sentence of excommunication against him, confirming at the same time the election of Rodolph, to whom he sent a golden crown, on which the following well-known verse, equally haughty and puerile, was engraved:

Petra dedit Petrus, Petrus diadema Rodolpho.

This donation was also accompanied with a most enthusiastic anathema against Henry. After depriving him of *strength in combat*, and condemning him *never to be victorious*, it concludes with the following remarkable apostrophe to St Peter and St Paul: "Make all men sensible, that as you can bind and loose every thing in heaven, you can also upon earth take from or give to every one, according to his deserts, empires, kingdoms, principalities—let the kings and the princes of the age, then instantly feel your power, that they may not dare to despise the orders of your church; let your justice be so speedily executed upon Henry, that nobody may doubt but he falls by your means, and not by chance."

In order to avoid the effects of this second excommunication, Henry assembled at Brixen, in the county of Tirol, about 20 German bishops: who acting also for the bishops of Lombardy, unanimously resolved, that the pope, instead of having power over the emperor, owed him obedience and allegiance; and that Gregory VII. having rendered himself unworthy of the papal chair by his conduct and rebellion, ought to be deposed from a dignity he so little deserved. They accordingly degraded Hildebrand; and elected in his room Guibert, archbishop of Ravenna, a person of undoubted merit, who took the name of *Clement III.* Henry promised to put the new pope in possession of Rome; but he was obliged, in the mean time, to employ all his forces against his rival Rodolph, who had re-assembled a large body of troops in Saxony. The two armies met near Mersburg, and both fought with great fury; but the fortune of the day seemed inclined to Rodolph, when his hand was cut off by the famous Godfrey of Bouillon, then in the service of Henry, and afterwards renowned for his conquest of Jerusalem.

Discouraged by the misfortune of their chief, the rebels immediately gave way; and Rodolph perceiving his end approaching, ordered the hand that was cut off to be brought him, and made a speech to his officers on the occasion, which could not fail to have an influence on the emperor's affairs. "Behold, (said he), the hand with which I took the oath of allegiance to Henry; and which oath, at the infliction of Rome, I have violated, in perfidiously aspiring at an honour that was not my due."

Thus delivered from this formidable antagonist, Henry soon dispersed the rest of his enemies in Germany, and set out for Italy in order to settle Clement in the papal chair. But the gates of Rome being shut against him, he was obliged to attack it in form. The siege continued upwards of two years; Henry, during that time, being obliged to quell some insurrections in Germany. The city was at length carried by assault, and with difficulty saved from being pillaged; but Gregory was not taken: he retired into the castle of St Angelo, and thence desired and excommunicated the conqueror. The new pope was, however, consecrated with the usual ceremonies; and expressed his gratitude by crowning Henry, with the concurrence of the Roman senate and people. Mean while the siege of St Angelo was going on; but the emperor being called about some affairs into Lombardy, Robert Guiscard took advantage of his absence to release Gregory, who died soon after at Salerno. His last words, borrowed from the Scripture, were worthy of the greatest saint: "I have loved justice, and hated iniquity; therefore I die in exile!"

Henry, however, did not enjoy all the advantages which might have been expected from the death of Gregory. The subsequent popes trod in the paths of their predecessor. In 1101, Pascal II. excited young Henry to rebel against his father. The emperor did all in his power to dissuade him from proceeding to extremities, but in vain. The young prince persisted in his rebellious intentions; and having by feigned submissions prevailed on the emperor to disband his army, he treacherously seized and confined him. Henry, however, found means to escape from his confinement, and attempted to engage all the sovereigns of Europe in his quarrel; but before any thing effectual could be done, he died at Liege in the year 1106.

The dispute about investitures was not terminated by the deposition and death of Henry IV. His son Henry V. pursued the very same conduct for which he had deposed his father. Pascal opposed him with violence: upon which Henry gave him an invitation into Germany, to end the dispute in an amicable manner. Pascal did not think proper to accept of this invitation; but put himself under the protection of Philip I. king of France, who undertook to mediate between the contending parties. His mediation, however, proved ineffectual, and Henry was prevented by the wars in Hungary and Poland from paying any further attention to the affair of investitures. At last, having settled his affairs in Germany, he took a resolution of going to Rome, in order to settle the dispute personally with the pope. To give his arguments the greater weight, however, he marched at the head of an army of 80,000 men. Pascal received him with great appearance of friendship, but would not renounce

52.
Rodolph
chosen em-
peror of
Germany.

54.
Rome
taken by
Henry IV.

55.
Dispute be-
tween the
pope and
Henry V.

53.
Defeated
and killed.

the claim of investitures; and Henry finding himself deceived in his expectations, ordered the pope to be seized. The consul put the citizens in arms to defend the pope, and a battle was fought within the walls of Rome. The slaughter was so great, that the waters of the Tiber were tinged with blood. The Romans were defeated, and Pascal was taken prisoner. The latter renounced his right of investiture; solemnly swore never to resume it, and broke his oath as soon as Henry was gone, by fulminating the sentence of excommunication against him. In 1114 died the countess Matilda, who had bequeathed all her dominions to the pope, as we have already observed; but Henry thinking himself the only lawful heir, alleged, that it was not in Matilda's power to alienate her estates, which depended immediately on the empire. He therefore set out for Lombardy, and sent ambassadors to the pope, beseeching him to revoke the sentence of excommunication abovementioned. Pascal, however, would not even favour the ambassadors with an audience; but, dreading the approach of Henry himself, he took refuge among the Norman princes in Apulia. Henry arrived at Rome in 1117; but being soon after obliged to leave it in order to settle some affairs in Tuscany, the pope returned to Rome, but died in a few days. On the third day after his decease, cardinal Cajetan was elected his successor, without the privy of the emperor, under the name of *Gelasius II.* The new pope was instantly deposed by Henry; who set up the archbishop of Prague, under the name of *Gregory VIII.* Gelasius, though supported by the Norman princes, was obliged to take refuge in France, where he died; and the archbishop of Vienna was elected by the cardinals then present, under the name of *Calixtus II.*

The new pope attempted an accommodation with Henry; which not succeeding, he excommunicated the emperor, the antipope, and his adherents. He next set out for Rome, where he was honourably received; and Gregory VIII. was forced to retire to Sutri, a strong town garrisoned by the emperor's troops. Here he was besieged by Calixtus and the Norman princes. The city was soon taken, and Gregory thrown into prison by his competitor; but at last, the states of the empire, being quite wearied out with such a long quarrel, unanimously supplicated Henry for peace. He referred himself entirely to their decision; and a diet being assembled at Wurtzburg, it was decreed, that an embassy should be immediately sent to the pope, desiring that he would convoke a general council at Rome, by which all disputes might be determined. This was accordingly done, and the affair of investitures at length regulated in the following manner, viz. That the emperor should leave the communities and chapters at liberty to fill up their own vacancies, without bestowing investitures with the cross and ring; that he should restore all that he had unjustly taken from the church; that all elections should be made in a canonical manner, in presence of the emperor or his commissaries; and whatever disputes might happen, should be referred to the decision of the emperor, assisted by the metropolitan and his suffragans; that the person elected should receive from the emperor the investiture of the fiefs and secular rights, not with the cross, but with the

sceptre; and should pay allegiance to him for these rights only.

After the death of Henry, the usual disorders took place in Italy; during which, Roger duke of Apulia conquered the island of Sicily, and assumed the right of creating popes, of whom there were two at that time, viz. Innocent II. and Anacletus. Roger drove out the former, and Lothario emperor of Germany the latter, forcing Roger himself at the same time to retire into Sicily. The emperor then conducted Innocent back to Rome in triumph, and having subdued all Apulia, Calabria, and the rest of Roger's Italian dominions, erected them into a principality, and bestowed it, with the title of *duke*, upon Renaud a German prince, and one of his own relations.

In the reign of Conrad III. who succeeded Lothario, the celebrated factions called the *Guelphs* and *Gibelines**, arose, which for many years deluged the cities of Italy with blood. They took their origin during a civil war in Germany, in which the enemies of the emperor were styled *Guelphs*, and his friends *Gibelines*; and these names were quickly received in Italy as well as other parts of the emperor's dominions. Of this civil war many of the cities in Italy took the advantage to set up for themselves; neither was it in the power of Conrad, who during his whole reign was employed in unsuccessful crusades, to reduce them; but, in 1158, Frederic Barbarossa, successor to Conrad, entered Italy at the head of a very numerous and well disciplined army. His army was divided into several columns for the convenience of entering the country by as many different routes. Having passed the Alps, he reduced the town of Brescia; where he made several salutary regulations for the preservation of good order and military discipline. Continuing to advance, he besieged Milan, which surrendered at discretion. He was crowned king of Lombardy at Monza; and having made himself master of all the other cities of that country, he ordered a minute inquiry to be set on foot concerning the rights of the empire, and exacted homage of all those who held of it, without excepting even the bishops. Grievances were redressed; magistracies reformed; the rights of regality discussed and ascertained; new laws enacted for the maintenance of public tranquillity and the encouragement of learning, which now began to revive in the school of Bologna; and, above all, subvassals were not only prohibited from alienating their lands, but also compelled, in their oath to their lords paramount, to except the emperor nominally, when they swore to serve and assist them against all their enemies. The pope took umbrage at this behaviour towards the ecclesiastics: but Frederic justified what he had done, telling his deputies it was but reasonable they should do homage for the fiefs they possessed; as Jesus Christ himself, though the lord of all the sovereigns upon earth, had deigned to pay for himself and St Peter the tribute which was due to Cæsar.

Frederic having sent commissaries to superintend the election of new magistrates at Milan, the inhabitants were so much provoked at this infringement of their old privileges, that they insulted the imperialists, revolted, and refused to appear before the emperor's tribunal. This he highly resented, and resolved to chastise them severely: for which purpose he sent

* See *Guelphs* and *Gibelines*.

57
Italy invaded by Frederic Barbarossa.

Italy.

for a reinforcement from Germany, which soon after arrived with the empress, while he himself ravaged Liguria, declared the Milanese rebels to the empire, and plundered and burnt the city of Crema which was in alliance with that of Milan.

In the mean time, pope Adrian IV. dying, two opposite factions elected two persons known by the names of *Victor II.* and *Alexander III.* The emperor's allies necessarily acknowledged the pope chosen by him; and those princes who were jealous of the emperor, acknowledged the other. *Victor II.* Frederick's pope, had Germany, Bohemia, and one half of Italy, on his side; while the rest submitted to Alexander III. The emperor took a severe revenge on his enemies; Milan was razed from the foundation, and salt strewed on its ruins; Brescia and Piacentia were dismantled; and the other cities which had taken part with them, were deprived of their privileges. Alexander III. however, who had excited the revolt, returned to Rome after the death of his rival; and at his return the civil war was renewed. The emperor caused another pope, and after his death a third, to be elected. Alexander then fled to France, the common asylum of every pope who was oppressed by the emperors; but the flames of civil discord which he had raised, continued daily to spread. In 1168, the cities of Italy, supported by the Greek emperor and the king of Sicily, entered into an association for the defence of their liberties; and the pope's party at length prevailed. In 1176, the imperial army, worn out by fatigues and diseases, was defeated by the confederates, and Frederick himself narrowly escaped. About the same time, he was defeated at sea by the Venetians; and his eldest son Henry, who commanded his fleet, fell into the hands of the enemy. The pope, in honour of this victory, sailed out into the open sea, accompanied by the whole senate; and after having pronounced a thousand benedictions on that element, threw into it a ring as a mark of his gratitude and affection. Hence the origin of that ceremony which is annually performed by the Venetians, under the notion of espousing the Adriatic. These misfortunes disposed the emperor towards a reconciliation with the pope: but, reckoning it below his dignity to make an advance, he rallied his troops, and exerted himself with so much vigour in repairing his loss, that the confederates were defeated in a battle; after which he made proposals of peace, which were now joyfully accepted, and Venice was the place appointed for a reconciliation. The emperor, the pope, and a great many princes and cardinals, attended; and there the emperor, in 1177, put an end to the dispute, by acknowledging the pope, kissing his feet, and holding his stirrup while he mounted his mule. This reconciliation was attended with the submission of all the towns of Italy which had entered into an association for their mutual defence. They obtained a general pardon, and were left at liberty to use their own laws and forms of government, but were obliged to take the oath of allegiance to the emperor as their superior lord. Calixtus, the antipope, finding himself abandoned by the emperor in consequence of this treaty, made also his submission to Alexander, who received him with great humanity; and in order to prevent, for the future, those disturbances which had so often attended the

lections of the popes, he called a general council, in which it was decreed, that no pope should be deemed duly elected, without having two thirds of the votes in his favour.

The affairs of Italy being thus settled, Barbarossa returned to Germany; and having quieted some disturbances which had arisen during his absence in Italy, at last undertook an expedition into the Holy Land; where having performed great exploits, he was drowned as he was swimming in the river Cydnus, in the year 1190. He was succeeded by his son Henry VI. who at the same time became heir to the dominions of Sicily by the right of his wife, daughter of William king of that country. After settling the affairs of Germany, the new emperor marched with an army into Italy, in order to be crowned by the pope, and to recover the succession of Sicily, which was usurped by Tancred his wife's natural brother. For this purpose, he endeavoured to conciliate the affections of the Lombards, by enlarging the privileges of Genoa, Pisa, and other cities, in his way to Rome; where the ceremony of the coronation was performed by Celestin III. on the day after Easter in the year 1191. The pope, then in the 86th year of his age, had no sooner placed the crown upon Henry's head than he kicked it off again, as a testimony of the power residing in the sovereign pontiff to make and unmake emperors at his pleasure.

The coronation being over, Henry prepared for the conquest of Naples and Sicily; but in this he was opposed by the pope: for though Celestin considered Tancred as an usurper, and desired to see him deprived of the crown of Sicily, which he claimed as a fief of the see, yet he was much more averse to the emperor's being put in possession of it, as that would render him too powerful in Italy for the interest of the church. Henry, however, without paying any regard to the threats and remonstrances of his holiness, took almost all the towns of Campania, Calabria, and Apulia; invested the city of Naples; and sent for the Genoese fleet, which he had before engaged, to come and form the blockade by sea: but before its arrival, he was obliged to raise the siege, in consequence of a dreadful mortality among his troops: and all future attempts upon Sicily were ineffectual during the life of Tancred.

The whole reign of Henry from this time seems to have been a continued train of the most abominable perfidies and cruelties. Having treacherously seized and imprisoned Richard I. of ENGLAND, in the manner related under that article, n° 128,—130. he had no sooner received the ransom paid for his royal captive, than he made new preparations for the conquest of Sicily. As Tancred died about this time, the emperor, with the assistance of the Genoese, accomplished his purpose. The queen dowager surrendered Salerno, and her right to the crown, on condition that her son William should possess the principality of Tarentum; but Henry no sooner found himself master of the place, than he ordered the infant-king to be castrated, to have his eyes put out, and to be confined in a dungeon. The royal treasure was transported to Germany, and the queen and her daughter confined in a convent.

In the mean time, the empress, though near the age

Italy.

60
Frederic'
succeeded
by Hen-
ry VI.

58
He takes
and de-
stroys Mi-
lan, &c.

59
Submits
to the pope.

61
His per-
fidy and
cruelty.

Italy.

of 50, was delivered of a son, named *Frederic*; and Henry soon after assembled a diet of the princes of Germany, to whom he explained his intentions of rendering the imperial crown hereditary, in order to prevent those disturbances which usually attended the election of emperors. A decree passed for this purpose; and *Frederic*, yet in his cradle, was declared king of the Romans. Soon after, the emperor being solicited to undertake a crusade, obeyed the injunctions of the pope, but in such a manner as to make it turn out to his own advantage. He convoked a general diet at Worms, where he solemnly declared his resolution of employing his whole power, and even of hazarding his life, for the accomplishment of so holy an enterprise; and he expatiated upon the subject with so much eloquence, that almost the whole assembly took the cross. Nay, such multitudes from all the provinces of the empire enlisted themselves, that Henry divided them into three large armies; one of which, under the command of the bishop of Mentz, took the route of Hungary, where it was joined by Margaret, queen of that country, who entered herself in this pious expedition, and actually ended her days in Palestine: the second was assembled in Lower Saxony, and embarked in a fleet furnished by the inhabitants of Lubec, Hamburg, Holstein, and Friesland: and the emperor in person conducted the third into Italy, in order to take vengeance on the Normans in Naples and Sicily, who had risen against his government.

The rebels were humbled; and their chiefs were condemned to perish by the most excruciating tortures. One Jorndani, of the house of the Norman princes, was tied naked on a chair of red-hot iron, and crowned with a circle of the same burning metal, which was nailed to his head. The empress shocked at such cruelty, renounced her faith to her husband, and encouraged her countrymen to recover their liberties. Resolution sprung from despair. The inhabitants betook themselves to arms; the empress *Constantia* headed them; and Henry, having dismissed his troops, no longer thought necessary to his bloody purposes, and sent them to pursue their expedition to the Holy Land, was obliged to submit to his wife, and to the conditions which she was pleased to impose on him in favour of the Sicilians. He died at Messina in 1197, soon after this treaty; and, as was supposed, of poison administered by the empress.

62
Disturbances in the beginning of the reign of *Frederic II.*

The emperor's son *Frederic* had already been declared king of the Romans, and consequently became emperor on the death of his father; but as *Frederic II.* was yet a minor, the administration was committed to his uncle the duke of Suabia, both by the will of Henry and by an assembly of the German princes. Other princes, however, incensed to see an elective empire become hereditary, held a new diet at Cologne, and chose *Otho* duke of Brunswick, son of Henry the Lion. *Frederic's* title was confirmed in a third assembly, at Arnburg; and his uncle, Philip duke of Suabia, was elected king of the Romans, in order to give greater weight to his administration. These two elections divided the empire into two powerful factions, and involved all Germany in ruin and desolation. *Innocent III.* who had succeeded *Celestin* in the papal chair, threw himself into the scale of *Otho*, and excommunicated Philip and all his adherents. This able

Italy.

and ambitious pontiff was a sworn enemy of the house of Suabia; not from any personal animosity, but out of a principle of policy. That house had long been terrible to the popes, by its continual possession of the imperial crown; and the accession of the kingdom of Naples and Sicily, made it still more to be dreaded: *Innocent*, therefore, gladly seized the present favourable opportunity for divesting it of the empire, by supporting the election of *Otho*, and sowing divisions among the Suabian party. *Otho* was also patronised by his uncle, the king of England; which naturally inclined the king of France to the side of his rival. Faction clashed with faction; friendship, with interest; caprice, ambition, or resentment, gave the sway; and nothing was beheld on all hands, but the horrors and the miseries of civil wars.

Meanwhile, the empress *Constantia* remained in Sicily, where all was peace, as regent and guardian for her infant son, *Frederic II.* who had been crowned king of that island, with the consent of pope *Celestin III.* But she also had her troubles. A new investiture from the holy see being necessary, on the death of *Celestin*, *Innocent III.* his successor, took advantage of the critical situation of affairs for aggrandizing the papacy, at the expense of the kings of Sicily. They possessed, as has been already observed, the privilege of filling up vacant benefices, and of judging all ecclesiastical causes in the last appeal: they were really popes in their own island, though vassals of his holiness. *Innocent* pretended that these powers had been surreptitiously obtained; and demanded, that *Constantia* should renounce them in the name of her son, and do liege, pure and simple homage for Sicily. But before any thing was settled relative to this affair, the empress died, leaving the regency of the kingdom to the pope; so that he was enabled to prescribe what conditions he thought proper to young *Frederic*. The troubles of Germany still continued; and the pope redoubled his efforts, to detach the princes and prelates from the cause of Philip, notwithstanding the remonstrances of the king of France, to whom he proudly replied, "Either Philip must lose the empire, or I the papacy." But all these dissensions and troubles in Europe, did not prevent the formation of another crusade, or expedition into Asia, for the recovery of the Holy Land. Those who took the cross were principally French and Germans: Baldwin, count of Flanders, was their commander; and the Venetians, as greedy of wealth and power as the ancient Carthaginians, furnished them with ships, for which they took care to be amply paid both in money and territory. The Christian city of Zara, in Dalmatia, had withdrawn itself from the government of the republic: the army of the cross undertook to reduce it to obedience; and it was besieged and taken, notwithstanding the threats and excommunications of the pope.

While the crusaders were spreading desolation thro' the east, Philip and *Otho* were in like manner desolating the west. At length Philip prevailed; and *Otho*, obliged to abandon Germany, took refuge in England. Philip, elated with success, confirmed his election by a second coronation, and proposed an accommodation with the pope, as the means of finally establishing his throne; but before it could be brought about, he fell a sacrifice to private revenge,

Italy.

being affianced by the count Palatine of Bavaria, whose daughter he had promised to marry, and afterwards rejected. Otho returned to Germany on the death of Philip; married that prince's daughter; and was crowned at Rome by pope Innocent III. after yielding to the holy see the long disputed inheritance of the counts Matilda, and confirming the rights and privileges of the Italian cities. But these concessions, as far at least as regarded the pope, were only a sacrifice to present policy; Otho, therefore, no sooner found himself in a condition to act offensively, than he resumed his grant; and, in 1210, not only recovered the possessions of the empire, but made hostile incursions into Apulia, ravaging the dominions of young Frederic, king of Naples and Sicily, who was under the protection of the holy see. For this reason he was excommunicated by Innocent, and Frederic, now 17 years of age, was elected emperor by a diet of the German princes. Otho, however, on his return to Germany, finding his party still considerable, and not doubting but he should be able to humble his rival by means of his superior force, entered into an alliance with his uncle, John king of England, against Philip Augustus king of France, A. D. 1213. The unfortunate battle of Bouvines, where the confederates were defeated, completed the fate of Otho. He attempted to retreat into Germany, but was prevented by young Frederic; who had marched into the empire at the head of a powerful army, and was every where received with open arms. Thus abandoned by all the princes of Germany, and altogether without resource, Otho retired to Brunswick, where he lived four years as a private man, dedicating his time to the duties of religion.

Frederic II. being now universally acknowledged emperor, was crowned at Aix-la-Chapelle in 1215, with great magnificence; when, in order to preserve the favour of the pope, he added to the other solemnities of his coronation, a vow to go in person to the Holy Land.

The bad success of this expedition hath been already taken notice of, under the article *CROISADE*. The emperor had, on various pretences, refused to go into the east; and in 1225, the pope, incensed at the loss of Damietta, wrote a severe letter to him, taxing him with having sacrificed the interests of Christianity by delaying so long the performance of his vow, and threatening him with immediate excommunication if he did not instantly depart with an army into Asia. Frederic, exasperated at these reproaches, renounced all correspondence with the court of Rome; renewed his ecclesiastical jurisdiction in Sicily; filled up vacant sees and benefices; and expelled some bishops, who were creatures of the pope, on pretence of their being concerned in practices against the state.

The pope at first threatened the emperor with the thunder of the church, for presuming to lift up his hand against the sanctuary; but finding Frederic not to be intimidated, he became sensible of his own impudence in wantonly incurring the resentment of so powerful a prince, and thought proper to soothe him by submissive apologies and gentle exhortations. They were accordingly reconciled, and conferred together at Veroli in 1226; where the emperor, as a proof of his sincere attachment to the church, published some very

Italy.

severe edicts against heresy, which seem to have authorised the tribunal of the inquisition. A solemn assembly was afterwards held at Ferentino, where both the pope and the emperor were present, together with John de Brienne, titular king of Jerusalem, who was come to Europe to demand succours against the sultan of Egypt. John had an only daughter, named *Yolanda*, whom he proposed as a wife to the emperor, with the kingdom of Jerusalem as her dower, on condition that Frederic should, within two years, perform the vow he had made to lead an army into the holy land. Frederic married her on these terms, because he chose to please the pope; and since that time the kings of Sicily have taken the title of *king of Jerusalem*. But the emperor was in no hurry to go and conquer his wife's portion, having business of more importance on his hands at home. The chief cities of Lombardy had entered into a secret league, with a view to renounce his authority. He convoked a diet at Cremona, where all the German and Italian noblemen were summoned to attend. A variety of subjects were there discussed; but nothing of consequence was settled. An accommodation, however, was soon after brought about by the mediation of the pope; who, as umpire of the dispute, decreed, that the emperor should lay aside his resentment against the confederate towns, and that the towns should furnish and maintain 400 knights for the relief of the holy land.

Peace being thus concluded, Honorius reminded the emperor of his vow: Frederic promised compliance; but his holiness died before he could see the execution of a project which he seemed to have so much at heart. He was succeeded in the papal chair by Gregory IX. brother of Innocent III.; who, pursuing the same line of policy, urged the departure of Frederic for the holy land; and finding the emperor still backward, declared him incapable of the imperial dignity, as having incurred the sentence of excommunication. Frederic, incensed at such insolence, ravaged the patrimony of St Peter; and was actually excommunicated. The animosity between the Guelphs and Ghibellines revived; the pope was obliged to quit Rome; and Italy became a scene of war and desolation, or rather of an hundred civil wars; which, by inflaming the minds and exciting the resentment of the Italian princes, accustomed them but too much to the horrid practices of poisoning and assassination.

During these transactions, Frederic, in order to remove the cause of all these troubles, and gratify the prejudices of a superstitious age, by the advice of his friends, resolved to perform his vow; and he accordingly embarked for the Holy Land, leaving the affairs of Italy to the management of Renaldo duke of Spoleto. The pope prohibited his departure before he should be absolved from the censures of the church; but Frederic went in contempt of the church, and succeeded better than any person who had gone before him. He did not indeed desolate Asia, and gratify the barbarous zeal of the times by spilling the blood of infidels; but he concluded a treaty with Miliden, sultan of Egypt and master of Syria; by which the end of his expedition seemed fully answered. The sultan ceded to him Jerusalem and its territory, as far as Joppa; Bethlem, Nazareth, and all the country between Jerusalem and Ptolemais; Tyre, Sidon, and the

63
His quarrel
with the
pope.

64
His expe-
dition to
the Holy
Land.

Italy. the neighbouring territories : in return for which, the emperor granted the Saracens a truce of ten years ; and, in 1230, prudently returned to Italy, where his presence was much wanted.

Frederic's reign, after his return from the east, was one continued quarrel with the popes. The cities of Lombardy had revolted during his absence, at the instigation of Gregory IX. ; and before they could be reduced, the same pontiff excited the emperor's son Henry, who had been elected king of the Romans, to rebel against his father. The rebellion was suppressed, the prince was confined, and the emperor obtained a complete victory over the associated towns. But his troubles were not yet ended. The pope excommunicated him anew, and sent a bull, filled with the most absurd and ridiculous language, into Germany, in order to sow division between Frederic and the princes of the empire.

Frederic retorted in the same strain, in his apology to the princes of Germany, calling Gregory the *Great Dragon*, the *Antichrist*, &c. The emperor's apology was sustained in Germany ; and finding he had nothing to fear from that quarter, he resolved to take ample vengeance on the pope and his associates. For that purpose he marched to Rome, where he thought his party was strong enough to procure him admission ; but this favourite scheme was defeated by the activity of Gregory, who ordered a crusade to be preached against the emperor, as an enemy of the Christian faith ; a step which incensed Frederic so much, that he ordered all his prisoners, who wore the cross, to be exposed to the most cruel tortures. The two factions of the Guelphs and Ghibellines continued to rage with greater violence than ever, involving cities, districts, and even private families, in troubles, divisions, and civil butchery ; no quarter being given on either side. Meanwhile Gregory IX. died, and was succeeded in the see of Rome by Celestin IV. and afterwards by Innocent IV. formerly cardinal Fiesque, who had always expressed the greatest regard for the emperor and his interests. Frederic was accordingly congratulated upon this occasion : but having more penetration than those about him, he sagely replied, " I feel little reason to rejoice ; the cardinal was my friend, but the pope will be my enemy." Innocent soon proved the justice of this conjecture. He attempted to negotiate a peace for Italy ; but not being able to obtain from

Frederic his exorbitant demands, and in fear for the safety of his own person, he fled into France, assembled a general council at Lyons, and, in 1245, deposed the emperor.

Conrad, the emperor's second son, had already been declared king of the Romans, on the death of his brother Henry, which soon followed his confinement : but the empire being now declared vacant by the pope, the German bishops, (for none of the princes were present), at the instigation of his holiness, proceeded to the election of a new emperor ; and they chose Henry landgrave of Thuringia, who was styled in derision, *The king of priests*. Innocent now renewed the crusade against Frederic. It was proclaimed by the preaching friars, since called *Dominicans*, and the minor friars, known by the name of *Cordeliers* or *Franciscans*. The pope, however, did not confine himself to these measures only, but engaged in conspiracies

against the life of an emperor, who had dared to resist the decree of a council, and oppose the whole body of monks and zealots. Frederic's life was several times in danger from plots, poisonings, and assassinations ; which induced him, it is said, to make choice of Mahometan guards, who, he was certain, would not be under the influence of the prevailing superstition.

About this time the landgrave of Thuringia dying, the same prelates who had taken the liberty of creating one emperor made another ; namely, William count of Holland, a young nobleman of twenty years of age, who bore the same contemptuous title with his predecessor. Fortune, which had hitherto favoured Frederic, seemed now to desert him. He was defeated before Parma, which he had long besieged ; and to complete his misfortune, he soon after learned, that his natural son Entius, whom he had made king of Sardinia, was worsted and taken prisoner by the Bolognese.

In this extremity, Frederic retired to his kingdom of Naples, in order to recruit his army ; and there died of a fever, in the year 1250. After his death, the affairs of Germany fell into the utmost confusion, and Italy continued long in the same distracted state in which he had left it. The clergy took arms against the laity ; the weak were oppressed by the strong ; and all laws divine and human were disregarded. After the death of Frederic's son Conrad who had assumed the imperial dignity as successor to his father, and the death of his competitor William of Holland, a variety of candidates appeared for the empire, and several were elected by different factions ; among whom was Richard earl of Cornwall, brother to Henry II. king of England : but no emperor was properly acknowledged till the year 1273, when Rodolph, count of Hapsburg, was unanimously raised to the vacant throne. During the interregnum which preceded the election of Rodolph, Denmark, Holland, and Hungary, entirely freed themselves from the homage they were wont to pay to the empire ; and much about the same time several German cities erected a municipal form of government, which still continues. Lubec, Cologne, Brunswick, and Dantzic, united for their mutual defence against the encroachments of the great lords, by a famous association, called the *Hanseatic league* ; and these towns were afterwards joined by eighty others, belonging to different states, which formed a kind of commercial republic. Italy also, during this period, assumed a new plan of government. That freedom for which the cities of Lombardy had so long struggled, was confirmed to them for a sum of money : they were emancipated by the fruits of their industry. Sicily likewise changed its government and its prince ; of which revolution a particular account is given under the article SICILY.

From the time of Frederic II. we may date the ruin of the German power in Italy. The Florentines, the Pisans, the Genoese, the Lucans, &c. became independent, and could not again be reduced. The power of the emperor, in short, was in a manner annihilated, when Henry VII. undertook to restore it in the beginning of the 14th century. For this purpose a diet was held at Frankfurt, where proper supplies being granted for the emperor's journey, well known by the name of the *Roman expedition*, he set out for

65
Decline of
the power
of the Ger-
man empe-
rors.

65
Is deposed
by the
pope.

67
Expedition
of Henry
VII. into
Italy.

Italy.

Italy.

Italy, accompanied by the dukes of Austria and Bavaria, the archbishop of Trier, the bishop of Liege, the counts of Savoy and Flanders, and other noblemen, together with the militia of all the imperial towns. Italy was still divided by the factions of the Guelphs and Ghibelines, who butchered one another without humanity or remorse. But their contest was no longer the same: it was not now a struggle between the empire and the priesthood, but between faction and faction, inflamed by mutual jealousies and animosities. Pope Clement V. had been obliged to leave Rome, which was in the anarchy of popular government. The Colonnas, the Ursini, and the Roman barons, divided the city; and this division was the cause of a long abode of the popes in France, so that Rome seemed equally lost to the popes and the emperors. Sicily was in the possession of the house of Arragon, in consequence of the famous massacre called the *Sicilian vespers*, which delivered that island from the tyranny of the French*. Carobert, king of Hungary, disputed the kingdom of Naples with his uncle Robert, son of Charles II. of the house of Anjou. The house of Este had established itself at Ferrara; and the Venetians wanted to make themselves masters of that country. The old league of the Italian cities no longer subsisted. It had been formed with no other view than to oppose the emperors; and since they had neglected Italy, the cities were wholly employed in aggrandizing themselves, at the expence of each other. The Florentines and the Genoese made war upon the republic of Pisa. Every city was also divided into factions within itself. In the midst of these troubles Henry VII. appeared in Italy in the year 1311, and caused himself to be crowned king of Lombardy at Milan. But the Guelphs had concealed the old iron crown of the Lombard kings, as if the right of reigning were attached to a small circlet of metal. Henry ordered a new crown to be made, with which the ceremony of inauguration was performed.

Cremona was the first place that ventured to oppose the emperor. He reduced it by force, and laid it under heavy contributions. Parma, Vicenza, and Placentia, made peace with him on reasonable conditions. Padua paid 100,000 crowns, and received an imperial officer as governor. The Venetians presented Henry with a large sum of money, an imperial crown of gold enriched with diamonds, and a chain of very curious workmanship. Brescia made a desperate resistance, and sustained a very severe siege; in the course of which the emperor's brother was slain, and his army diminished to such a degree, that the inhabitants marched out under the command of their prefect, Thibault de Drussati, and gave him battle: but they were repulsed with great loss, after an obstinate engagement; and at last obliged to submit, and their city was dismantled. From Brescia Henry marched to Genoa, where he was received with expressions of joy, and splendidly entertained. He next proceeded to Rome; where, after much bloodshed, he received the imperial crown from the hands of the cardinals. Clement V. who had originally invited Henry into Italy, growing jealous of his success, had league with Robert king of Naples, and the Ursini faction, to oppose his entrance into Rome. He en-

tered it in spite of them, by the assistance of the Colonnas. Now master of that ancient city, Henry appointed it a governor; and ordered, that all the cities and states of Italy should pay him an annual tribute. In this order he comprehended the kingdom of Naples, to which he was going to make good his claim of superiority by arms, when he died at Benevento in 1313, as is commonly supposed, of poison given him by a Dominican friar, in the consecrated wine of the sacrament.

The efforts of Henry VII. were unable to restore the imperial power in Italy. From this time the authority of the emperor in that country consisted in a great measure in the convenience which the Ghibelines found in opposing their enemies under the sanction of his name. The power of the pope was much of the same nature. He was less regarded in Italy than in any other country in Christendom. There was indeed a great party who called themselves *Guelphs*; but they affected this distinction only to keep themselves independent of the imperialists; and the states and princes who called themselves *Guelphs* paid little more acknowledgement to his holiness, than sheltering themselves under his name and authority. The most desperate wars were carried on by the different cities against each other; and in these wars Castruccio Castracani, and Sir John Hawkwood an Englishman, are celebrated as heroes. A detail of these transactions would furnish materials for many volumes; and after all seems to be but of little importance, since nothing material was effected by the utmost efforts of valour, and the belligerent states were commonly obliged to make peace without any advantage on either side. By degrees, however, this martial spirit subsided; and in the year 1492, the Italians were so little capable of resisting an enemy, that Charles VIII. of France conquered the whole kingdom of Naples in six weeks, and might easily have subdued the whole country had it not been for his own imprudence. Another attempt on Italy was made by Lewis XII. and a third by Francis I. But for an account of the bad success of these expeditions, see the article FRANCE n° 68—75. In the reigns of Lewis XIII. and XIV. an obstinate war was carried on between the French and Spaniards, in which the Italian states bore a very considerable share. The war concluded in 1660, with very little advantage to the French, who have been always unsuccessful in their Italian wars. The like bad success attended them in that part of the world, in the war which commenced between Britain and Spain in the year 1740. But the particulars of these wars with regard to the different states of Italy, naturally fall to be considered under the history of those states into which the country is now divided; viz. Sardinia, Milan or the Milanese, Genoa, Venice, Tuscany or Florence, Lucca, St Marino, Parma, Mantua, Modena, Rome, and Naples.

The air of Italy is very different, according to the different situations of the several countries contained in Italy. In those on the north of the Apennines it is more temperate, but on the south it is generally very warm. The air of the Campagna of Rome, and of the Ferrarese, is said to be unhealthy; which is owing to the lands not being duly cultivated, nor the marshes drained. That of the other parts is generally pure, dry, and

* See Sicily.

68
State of
Italy since
that time.69
Air, &c. of.

Italy.

and healthy. In summer, the heat is very great in the kingdom of Naples; and would be almost intolerable, if it was not somewhat alleviated by the sea-breezes. The soil of Italy in general is very fertile, being watered by a great number of rivers. It produces a great variety of wines, and the best oil in Europe; excellent silk in abundance; corn of all sorts, but not in such plenty as in some other countries; oranges, lemons, citrons, pomegranates, almonds, raisins, sugar, mulberry-trees without number, figs, peaches, nectarines, apricots, pears, apples, filberts, chestnuts, &c. Most of these fruits were at first imported by the Romans from Asia Minor, Greece, Africa, and Syria, and were not the natural products of the soil. The tender plants are covered in winter on the north side of the Apennines, but on the fourth side they have no need of it. This country also yields good pasture; and abounds with cattle, sheep, goats, buffaloes, wild boars, mules, and horses. The forests are well stored with game; and the mountains yield not only mines of iron, lead, alum, sulphur, marble of all sorts, alabaster, jasper, porphyry, &c. but also gold and silver; with a great variety of aromatic herbs, trees, shrubs, and ever-greens, as thyme, lavender, laurel, and bays, wild olive-trees, tamarinds, juniper, oaks, and pines.

A very extensive trade is carried on in many places in Italy, particularly at Leghorn, Genoa, Bologna, Venice, and Naples; the country having a great variety of commodities and manufactures for exportation, especially wine, oil, perfumes, fruits, and silks. Travellers also bring large sums of money into Italy, besides what they lay out in pictures, curiosities, relics, antiquities, &c.

The Italians are generally well proportioned, tho' their complexions are none of the best. As to dress, they follow the fashions of the countries on which they border, or to which they are subject, namely, those of France, Spain, and Germany. With respect to their genius and taste in architecture, painting, carving, and music, they are thought to excel greatly, and to leave the other nations of Europe far behind them: but their music seems too soft and effeminate to deserve all the praise bestowed on it; and their houses are far inferior to those of England in respect of convenience. No country hath produced better politicians, historians, poets, painters, and sculptors, we mean since the revival of the arts and sciences, exclusive of those of ancient times. The Italians are very affable, courteous, ingenious, sober, and ready-witted; but extremely jealous, vindictive, lascivious, ceremonious, and superstitious. In respect to jealousy, indeed, we are told, that a very extraordinary change hath lately taken place; and that the Italians are now no less indulgent and complaisant to their wives, than the most polite husbands in France itself. In their tempers, the Italians seem to be a good medium between the French and Spaniards; neither so gay and volatile as the one, nor so grave and solemn as the other. Boiled snails, served up with oil and pepper, or fried in oil, and the hinder parts of frogs, are reckoned dainty dishes. Kites, jackdaws, hawks, and magpies, are also eaten, not only by the common people, but the better sort. Wine is drank here both in summer and winter cooled by ice or snow. The women affect yellow hair, as the Roman ladies and

courtezans formerly did. They also use paint and waxes, both for their hands and faces. The day here is reckoned from sun-set to sun-set, as the Athenians did of old.

ITCH, a cutaneous disease, appearing in small watery pustules on the skin; commonly of a mild nature, though sometimes attended with obdurate and dangerous symptoms. See (the *Index* subjoined to) MEDICINE.

ITCH-Infest. See ACARUS.

ITEA, in botany, a genus of the monogynia order, belonging to the pentandria class of plants. There is but one species, a native of North-America. It grows by the sides of rivers, and in other parts where the ground is moist. It rises to the height of eight or 10 feet, sending out many branches garnished with spear-shaped leaves placed alternately, and slightly sawed on their edges, of a light green colour. At the extremity of the branches are produced fine spikes of white flowers three or four inches long, standing erect. When these shrubs are in vigour, they will be entirely covered with flowers, so that they make a beautiful appearance during the flowering season, which is in July. They are propagated by layers, and are not injured by the cold of this climate; but are apt to die in summer, if they are planted on a dry gravelly soil. The shoots should be laid down in autumn, and will be rooted in one year.

ITHACA (anc. geogr.), an island in the Ionian Sea on the coast of Epirus; the country of Ulysses near Dulichium, with a town and port situated at the foot of mount Neius. According to Ptolemy, it is about 25 miles in compass; according to Artemidorus, only 10; and is now found to be only eight miles round. It is now uninhabited, and called *Jathaco*.

ITINERARY, ITINERARIUM; a journal, or an account of the distances of places. The most remarkable is that which goes under the names of *Antoninus* and *Ethicus*; or, as Barthius found in his copy, *Antoninus Ethicus*; a Christian writer, posterior to the times of Constantine. Another, called *Hierosolymitanum*, from Bourdeaux to Jerusalem, and from Heraclea through Aulona and Rome to Milan, under Constantine.—*Itinerarium* denotes a day's march.

ITIUS PORTUS (anc. geogr.), the *crux geographorum*, such being the difficulty of ascertaining its position. It would be endless to recite the several opinions concerning it, with the several reasons advanced in support of them. Three ports are mentioned by Cæsar; two without any particular name, viz. the Higher and the Lower, with respect to the *Portus Itius*. Calais, Boulogne, St Omer, and Whitland, have each in their turn had their several advocates. Cæsar gives two distinctive characters or marks which seem to agree equally to Boulogne and Whitland, namely, the shortness of the passage, and the situation between two other ports; therefore nothing can with certainty be determined about the situation of the *Portus Itius*.

ITTIGIUS (Thomas), a learned professor of divinity at Leipsic, and son of John Ittigius, professor of physic in the same university. He first published *A treatise upon burning mountains*; after which he became a minister, and exercised that function in various churches.

Itch
Ittigius.

70
prefs, dis-
olution,
&c. of the
inhabitants.

churches there. He furnished several papers in the *Leipscig acts*, besides publishing some historical works and dissertations. He died in 1710.

ITZEHOA, an ancient and handsome town of Germany, in the circle of Lower Saxony, and duchy of Holstein. It belongs to the king of Denmark, and is seated on the river Stoor, in E. Long. 9. 25. N. Lat. 54. 8.

JUAN (St) DE LA FRONTERA, a town of South-America, in Chili, in the province of Chiquito, near the lake Guanacho. The territory of this town is inhabited by 20,000 native Americans, who are tributary to Spain. It contains mines of gold, and produces a kind of almonds that are very delicate. It is seated at the foot of the Andes, in W. Long. 66. 35. S. Lat. 23. 25.

JUAN de Porto Rico, an island of America, and one of the Caribbees, being 100 miles in length, and 50 in breadth. It belongs to the Spaniards; and is full of very high mountains, and extremely fertile valleys, interspersed with woods, and well watered with springs and rivulets. It produces sugar, rum, ginger, corn, and fruits; partly proper to the climate, and partly introduced from Spain. Besides, there are so many cattle, that they often kill them for the sake of the skins alone. Here are a great number of uncommon trees, and there is a little gold in the north part of the island. It is commonly said that the air is healthy; and yet the earl of Cumberland, when he had taken this island, lost most of his men by sickness, and for that reason was forced to abandon it. This happened in the reign of queen Elizabeth. It is subject to storms and hurricanes, like the rest of these islands. It lies to the east of Hispaniola, at the distance of 50 miles.

JUAN de Porto Rico, the capital town of the island of Porto Rico, with a good harbour defended by several forts, and a bishop's see. It is seated on the north coast of the island, in W. Long. 65. 35. N. Lat. 18. 30.

JUAN Fernandez, an island in the great South Sea, in S. Lat. 33. 40. and W. Long. 78. 30. from London. It was formerly a place of resort for the buccaniers who annoyed the western coast of the Spanish continent. They were led to resort hither from the multitude of goats which it nourished; to deprive their enemies of which advantage, the Spaniards transported a considerable number of dogs, which increasing greatly, have almost extirpated the goats, who now only find security among the steep mountains in the northern parts, which are inaccessible to their pursuers. There are instances of two men living, at different times, alone on this island for many years; the one a Musquito Indian; the other Alexander Selkirk, a Scotchman, who was, after five years, taken on board an English ship, which touched here in about 1710, and brought back to Europe. From the history of this recluse, Daniel de Foe is said to have conceived the idea of writing the adventures of Robinson Crusoe. This island was very propitious to the remains of commodore Anson's squadron in 1741, after having been buffeted with tempests, and debilitated by an inveterate scurvy, during a three months passage round Cape Horn: they continued here three months; during which time the dying crews, who on their arrival could

scarcely with one united effort heave the anchor, were restored to perfect health. Captain Carteret, in the *Swallow*, in 1767, having met with many difficulties and impediments in his passage into the South Sea, by the Straits of Magellan, attempted to make this island in order to recruit the health of his men; but he found it fortified by the Spaniards, and therefore chose rather to proceed to the island of Mafafuero. But M. de Bougainville, that same year, is said to have touched here for refreshments, although in the narrative of the voyage the fact is cautiously suppressed. This island is not quite 15 miles long, and about six broad; its only safe harbour is on the north side. It is said to have plenty of excellent water, and to abound with a great variety of esculent vegetables highly antiscorbutic; besides which, commodore Anson sowed a variety of garden-seeds, and planted the stones of plums, apricots, and peaches, which he was many years afterwards informed had thriven greatly; and now doubtless furnish a very valuable addition to the natural productions of this spot. Vast shoals of fish of various kinds frequent this coast, particularly cod of a prodigious size; and, it is said, in not less abundance than on the banks of Newfoundland. There are but few birds here, and those few are of species well known and common.

JUAN Blanco. See PLATINA.

JUBILEE, a time of public and solemn festivity among the ancient Hebrews. This was kept every 50th year: it began about the autumnal equinox, and was proclaimed by sound of trumpet throughout all the country. At this time all slaves were released, all debts annihilated, and all lands, houses, wives and children, however alienated, were restored to their first owners. During this whole year all kind of agriculture was forbidden; and the poor had the benefit of the harvest, vintage, and the other productions of the earth, in the same manner as in the sabbatic or seventh year. As this was designed to put the Israelites in mind of their Egyptian servitude, and to prevent their imposing the like upon their brethren, it was not observed by the Gentile profelytes.

The Christians, in imitation of the Jews, have likewise established *jubilees*, which began in the time of pope Boniface VIII. in the year 1300, and are now practised every 25 years: but these relate only to the pretended forgiveness of sins, and the indulgences granted by the church of Rome; together with the privilege of performing a thousand frolics in masquerade. The ceremony of the *jubilee* observed at Rome, begins in the following manner: The pope goes to St Peter's church, to open the holy gate, which is walled up, and opened only on this occasion; and, holding a golden hammer in his hand, he knocks at the gate three times, repeating these words, *Aperite mihi portas justitie, &c.* "Open to me the gates of righteousness; I will go into them, and I will praise the Lord, (Psalm cxviii. 19.)" Upon which the masons fall to work, and break down the wall that stops up the gate: which done, the pope kneels down before it, and the penitentiaries sprinkle him with holy water. Then, taking up the cross, he begins to sing *Te Deum*; and enters the church, followed by the clergy. In the mean time, three cardinal-legates are sent to open the three other holy gates which are in the

Jucatan
Judæa.

the churches of St John of Lateran, St Paul, and St Mary the Greater. When the holy year is expired, the holy gates are shut in this manner: The pope, after he has blessed the stones and mortar, lays the first stone, and leaves there 12 boxes of gold and silver medals; after which the holy gates are walked up as before, and continue so till the next jubilee.

JUCATAN, or YUCATAN, a large province of North-America, in New Spain, which is a peninsula. It is over-against the island of Cuba, and contains a large quantity of timber, proper for building ships; as also sugar, cassia, and Indian corn. The original inhabitants are few, they having been very ill used by the Spaniards. Merida is the capital town. It is a flat, level country; and is very unhealthy, which may be owing to the frequent inundations.

JUDAH, the fourth son of Jacob, and father of the chief of the tribes of the Jews, distinguished by his name, and honoured by giving birth to the Messiah, died 1636 B. C.

JUDAH *Hakkadosh*, or the Saint, a rabbi celebrated for his learning and riches, lived in the time of the emperor Antoninus, and was the friend and preceptor of that prince. Leo of Modena, a rabbi of Venice, tells us, that rabbi Judah, who was very rich, collected about 26 years after the destruction of the temple, in a book which he called the *Misna*, the constitutions and traditions of the Jewish magistrates who preceded him. But as this book was short and obscure, two Babylonish rabbis, Rabbena and Ase, collected all the interpretations, disputes, and additions, that had been made until their time upon the *Misna*, and formed the book called the *Babylonish Talmud* or *Gemara*; which is preferable to the Jerusalem Talmud, composed some years before by rabbi Jochanan of Jerusalem. The *Misna* is the text of the Talmud; of which we have a good edition in Hebrew and Latin by Surenhusius, with notes, in 3 vols folio. It were to be wished the fame had been done to the *Gemara*.

The kingdom of JUDAH was of small extent, compared with that of the kingdom of Israel; consisting only of two tribes, Benjamin and Judah: its east boundary, the Jordan; the Mediterranean its west, in common with the Danites, if we except some places recovered by the Philistines, and others taken by the kings of Israel: on the south, its limits seem to have been contracted under Hadad of the royal progeny of Edom, (1 Kings xi. 14.)

Tribe of JUDAH, one of the 12 divisions of Palestine by tribes, (Josh. xv.) having Idumea on the south, from the extremity of the Lacus Asphaltites, also the Wilderness of Zin, Cadesbarnea, and the brook or river of Egypt; on the east, the said lake; on the west, the Mediterranean; and on the north, the mouth of the said lake; where it receives the Jordan, Bethfemes, Thimna, quite to Ekron on the sea.

JUDEA, (anc. geog.) taken largely, either denotes all Palestine, or the greater part of it; and thus it is generally taken in the Roman history: Ptolemy, Rutilius, Jerome, Origen, and Eusebius, take it for the whole of Palestine. Here we consider it as the third part of it on this side the Jordan, and that the southern part, distinct from Samaria and Galilee; under which notion it is often taken, not only in Josephus, but also in the New Testament. It con-

tained four tribes; Judah, Benjamin, Dan, and Simeon, together with Philistia and Idumea; so as to be comprised between Samaria on the north, Arabia Petrea on the south, and to be bounded by the Mediterranean on the west, and by the Lacus Asphaltites, with part of Jordan, on the east. Josephus divides it into 11 toparchies; Pliny into 10; by which it has a greater extent than that just mentioned. See PALESTINE.

JUDAISM, the religious doctrines and rites of the Jews.

JUDAS MACCABEUS, a celebrated general of the Jews, renowned for his many victories over his enemies, at last slain in battle, 261 B. C. See (*History of the Jews*, n° 13.

JUDE (St), brother of St James the younger, and son of Joseph, (Mat. xiii. 55.) He preached in Mesopotamia, Arabia, Syria, Idumea; and died in Berytus for the confession of Christ. He writ that epistle which goes under his name, and after the death of most of the apostles. He was cruelly put to death for reproving the superstition of the Magi.

JUDE, or the *General Epistle of Jude*, a canonical book of the New Testament, written against the heretics, who, by their disorderly lives and impious doctrines, corrupted the faith and good morals of the Christians. St Jude draws them in lively colours, as men given up to their passions, full of vanity, conducting themselves by worldly wisdom, and not by the spirit of God.

JUDENBURG, a handsome and considerable town of Germany, in the circle of Austria, and capital of Upper Styria, with a handsome castle; the public buildings with the square are very magnificent. It is seated on the river Meur. E. Long. 15. 20. N. Lat. 47. 20.

JUDEX (Matthew), one of the principal writers of the centuries of Magdeburg, was born at Tiptewolde in Misnia, in 1528. He taught theology with great reputation; but met with many disquiets in the exercise of his ministry from party-feuds. He wrote several works, and died in 1564.

JUDGE, a chief magistrate of the law, appointed to hear causes, to explain the laws, and to pass sentence.

Book of JUDGES, a canonical book of the Old Testament, so called from its relating the state of the Israelites under the administration of many illustrious persons who were called *judges*, from being both the civil and military governors of the people, and who were raised up by God upon special occasions, after the death of Joshua, till the time of their making a king. In the time of this peculiar polity, there were several remarkable occurrences, which are recorded in this book. It acquaints us with the gross impiety of a new generation which sprung up after the death of Joshua; and gives us a short view of the dispensations of heaven towards this people, sometimes relieving and delivering them, and at others severely chastising them by the hands of their enemies.

JUDGMENT, among logicians, a faculty or rather act of the human soul, whereby it compares its ideas, and perceives their agreement or disagreement. See METAPHYSICS, n° 242—245; and LOGIC, Part II.

JUDGMENT, in law, is the sentence pronounced by the

Judicial
Judgment.

the court upon the matter contained in the record. Judgments are of four sorts. First, where the facts are confessed by the parties, and the law determined by the court; as in case of judgment upon *demurrer*: secondly, where the law is admitted by the parties, and the facts disputed; as in a case of judgment on *verdict*: thirdly, where both the fact and the law arising thereon are admitted by the defendant; which is the case of judgments by *confession* or *default*: or, lastly, where the plaintiff is convinced that either fact, or law, or both, are insufficient to support his action, and therefore abandons or withdraws his prosecution; which is the case in judgments upon a *nonsuit* or *retreat*.

The judgment, though pronounced or awarded by the judges, is not their determination or sentence, but the determination and sentence of the *law*. It is the conclusion that naturally and regularly follows from the premises of law and fact, which stand thus: Against him who hath rode over my corn, I may recover damages by law; but A hath rode over my corn; therefore I shall recover damages against A. If the major proposition be denied, this is a demurrer in law: if the minor, it is then an issue of fact: but if both be confessed (or determined) to be right, the conclusion or judgment of the court cannot but follow. Which judgment or conclusion depends not therefore on the arbitrary caprice of the judge, but on the settled and invariable principles of justice. The judgment, in short, is the remedy prescribed by law for the redress of injuries; and the suit or action is the vehicle or means of administering it. What that remedy may be, is indeed the result of deliberation and study to point out; and therefore the style of the judgment is, not that it is decreed or resolved by the court, for then the judgment might appear to be their own; but, "it is considered," *confideratum est per curiam*, that the plaintiff do recover his damages, his debt, his possession, and the like: which implies that the judgment is none of their own; but the act of law, pronounced and declared by the court, after due deliberation and inquiry. See *Blackst. Comment. iii. 396*.

JUDGMENT, in criminal cases, is the next stage of prosecution, after TRIAL and CONVICTION are past, in such crimes and misdemeanors as are either too high or too low to be included within the benefit of clergy. For when, upon a capital charge, the JURY have brought in their VERDICT guilty in the presence of the prisoner; he is either immediately, or at a convenient time soon after, asked by the court, if he has any thing to offer why judgment should not be awarded against him. And in case the defendant be found guilty of a misdemeanor, (the trial of which may, and does usually, happen in his absence, after he has once appeared), a *capias* is awarded and issued, to bring him in to receive his judgment; and, if he absconds, he may be prosecuted even to outlawry. But whenever he appears in person, upon either a capital or inferior conviction, he may at this period, as well as at his arraignment, offer any exceptions to the indictment, in arrest or stay of judgment: as for want of sufficient certainty in setting forth either the person, the time, the place, or the offence. And, if the objections be valid, the whole proceedings shall be set aside; but the party may be indicted again. And we may take

notice, 1. That none of the statutes of *jeoffails*, for amendment of errors, extend to indictments or proceedings in criminal cases; and therefore a defective indictment is not aided by a verdict, as defective pleadings in civil cases are. 2. That, in favour of life, great strictness has at all times been observed, in every point of an indictment. Sir Matthew Hale indeed complains, "that this strictness is grown to be a blemish and inconvenience in the law, and the administration thereof: for that more offenders escape by the over easy ear given to exceptions in indictments, than by their own innocence; and many times gross murders, burglaries, robberies, and other heinous and crying offences, remain unpunished by these unseemly niceties: to the reproach of the law, to the shame of the government, to the encouragement of villany, and to the dishonour of God." And yet, notwithstanding this laudable zeal, no man was more tender of life than this truly excellent judge.

A pardon also may be pleaded in arrest of judgment: and it has the same advantage when pleaded here, as when pleaded upon ARRAIGNMENT; viz. the saving the ATTAINDER, and, of course, the CORRUPTION of blood: which nothing can restore but parliament, when a pardon is not pleaded till after sentence. And certainly, upon all accounts, when a man hath obtained a pardon, he is in the right to plead it as soon as possible. See PARDON.

Praying the benefit of clergy may also be ranked among the motions in arrest of judgment. See Benefit of CLERGY.

If all these resources fail, the court must pronounce that judgment which the law hath annexed to the crime. Of these some are capital, which extend to the life of the offender, and consist generally in being hanged by the neck till dead; though in very atrocious crimes other circumstances of terror, pain, or disgrace, are superadded: as, in treasons of all kinds, being drawn or dragged to the place of execution; in high treason affecting the king's person or government, embowelling alive, beheading, and quartering; and in murder, a public dissection. And, in case of any treason committed by a female, the judgment is to be burned alive. But the humanity of the English nation has authorized, by a tacit consent, an almost general mitigation of such parts of these judgments as favour of torture or cruelty: a sledge or hurdle being usually allowed to such traitors as are condemned to be drawn; and there being very few instances (and those accidental or by negligence) of any person's being embowelled or burned, till previously deprived of sensation by strangling. Some punishments consist in exile or banishment, by abjuration of the realm, or transportation to the American colonies: others in loss of liberty, by perpetual or temporary imprisonment. Some extend to confiscation, by forfeiture of lands, or moveables, or both, or of the profits of lands for life: others induce a disability, of holding offices or employments, being heirs, executors, and the like. Some, though rarely, occasion a mutilation or dismembering, by cutting off the hand or ears: others fix a lasting stigma on the offender, by sitting the nostrils, or branding in the hand or face. Some are merely pecuniary, by stated or discretionary fines: and lastly, there are others, that consist principally in their

Judgment
Ives.

their ignominy, though most of them are mixed with some degree of corporal pain; and these are inflicted chiefly for such crimes, as either arise from indigence, or render even opulence disgraceful. Such as whipping, hard labour in the house of correction, the pillory, the stocks, and the ducking-stool.

Diffusing as this catalogue may seem, it will afford pleasure to a British reader, and do honour to the British laws, to compare it with that shocking apparatus of death and torment to be met with in the criminal codes of almost every other nation in Europe. And it is moreover one of the glories of our law, that the nature, tho' not always the quantity or degree, of punishment is ascertained for every offence; and that it is not left in the breast of any judge, nor even of a jury, to alter that judgment, which the law has beforehand ordained, for every subject alike, without respect of persons. For, if judgments were to be the private opinions of the judge, men would then be slaves to their magistrates; and would live in society, without knowing exactly the conditions and obligations which it lays them under. And besides, as this prevents oppression on the one hand; so, on the other, it stifles all hopes of impunity or mitigation, with which an offender might flatter himself if his punishment depended on the humour or discretion of the court. Whereas, where an established penalty is annexed to crimes, the criminal may read their certain consequence in that law, which ought to be the unvaried rule, as it is the inflexible judge, of his actions.

JUDGMENT of God, (Judicium Dei), in law, a term applied to the trial by combat, by ordeal, &c. See the articles DUEL, COMBAT, ORDEAL, &c.

JUDICIAL COMBAT. See BATTLE.

JUDOIGNE, a town of the Austrian Netherlands, in Brabant. Near this town the duke of Marlborough gained that signal victory over the French in 1706, called the *battle of Ramillies*. It is seated on the river Gete, 13 miles south-east of Louvain, and 16 north of Namur.

IVES, or *YVES*, (St.), a celebrated bishop of Chartres, born in the territory of Beauvais in the 11th century. His merit procured his election to the see of Chartres in 1092, or 1093, under the pontificate of Urban II. who had deposed Geoffroy his predecessor for sundry accusations against him. Ives particularly signalized himself by his zeal against Philip I. who had put away his wife Bertha of Holland, and had taken Bertrade of Montford, wife of Fouques count of Anjou. Afterward he devoted himself wholly to the functions of his ministry; made several religious foundations; and died in 1115. Pope Pius V. permitted the monks of the congregation of Lateran, to celebrate the festival of St Ives on the 20th of May. We have a collection of decrees of his compiling, *Exceptiones ecclesiasticarum regularum*, a *Chronicon*, and 22 sermons; all very valuable pieces, which were collected and published in one volume folio, in 1647, by John Baptist Souciet, canon of Chartres.

IVES (St.), a sea-port town of Cornwall, in England, seated on a bay of the same name; which being unsafe, it is only frequented by fishermen, for the taking of pilchards. However, it is a corporation, and sends two members to parliament. W. Long. 6. 15. N. Lat.

50. 15.

VOL. V.

Ives
Juglans.

IVES (St.), a town of Huntingdonshire, in England. It is an ancient, large, and handsome place, seated on the river Ouse, over which is a fine stone bridge. Here was a priory, which is now in ruins. It has one large church, two dissenting, and a Popish meeting, with about 500 houses; the streets are pretty wide, and tolerably well paved. W. Long. o. 7. N. Lat. 52. 20.

JUGERUM, in Roman antiquity, a square of 120 Roman feet; its proportion to the English acre being as 10,000 to 16,097.

JUGLANS, a genus of the polyandria order, belonging to the monœcia class of plants. There are five species, the most remarkable of which is the regia or common walnut. This rises 50 feet high or more, with a large upright trunk, branching into a very large spreading head, with large pinnated leaves, of two or three pair of oval, smooth, somewhat serrated lobes, terminated by an odd one; and monœcious flowers, succeeded by clusters of large green fruit, inclosing furrowed nuts of different shapes and sizes in the varieties, ripening in September and October. Other two species, called the *nigra* and *alba*, or black and white Virginian walnut, are also cultivated in this country, though they are less proper for fruit, having very small kernels.

Culture. All the sorts are propagated by planting their nuts, which will grow in any common soil. The nuts, being procured in the proper season, in their outer covers or husks if possible, they should be preserved in dry sand until February, and then planted. After two years growth in the seed-bed, they are to be taken out, and planted in the nursery, where they must remain till grown five or six feet high, when they must be transplanted where they are finally to remain; but if intended for timber as well as fruit-trees, they ought to be finally transplanted when they have attained the height of three or four feet.

Uses. The fruit is used at two different stages of growth; when green to pickle; and, when ripe, to eat raw. As a pickle, the nuts may be used when about half or three-fourths grown, before the outer coat or shell becomes hard; such nuts should be chosen as are most free from specks, and for this purpose they must be gathered by hand. Walnuts are ready for pickling in July and August. They are fully ripe in September and October; and are then commonly beat down with long poles, especially on large trees; for, as the walnuts grow mostly at the extremities of the branches, it would be troublesome and tedious to gather them by hand. As soon as gathered, lay them in heaps a few days to heat and sweat, to cause their outer husks, which adhere closely, to separate from the shell of the nuts; then clean them from the rubbish, and deposit them in some dry room for use, covering them over close with dry straw half a foot thick, and they will keep three or four months. They are always readily sold at market, especially in London; where, at their first coming in, they are sold with the husks on, by the sack or bushel; but afterwards are bought clean, and sold both by measure and by the thousand. The wood of the walnut-tree is also very valuable; not indeed where strength is necessary, it being of a very brittle nature; but the cabinet-makers and joiners esteem it highly for several sorts of household

furniture and other light works; for, being beautifully veined, it takes a fine polish, and the more knotty it is, the more it is valued for particular purposes. Walnut-trees are also well adapted for planting round the borders of orchards, where, by their large spreading heads, they will also guard the lesser fruit-trees from boisterous winds. The kernels of the nuts are similar in quality to almonds; but are not, like them, used in medicine.

JUGORA, a considerable province of Muscovy, depending on the government of Archangel. It has the title of a duchy; and is inhabited by a kind of Tartars, who are very savage, and much of the same disposition with the Samoides.

IVICA, or **YVICA**, the name of an island in the Mediterranean. See **YVICA**.

JUICE, denotes the sap of vegetables, or the liquors of animals. See **ANATOMY**, **BLOOD**, **PLANTS**, **SAP**, &c.

The juices of several plants are expressed to obtain their essential salts, and for several medicinal purposes, with intention either to be used without further preparation, or to be made into syrups and extracts. The general method of extracting these juices is, by pounding the plant in a marble mortar, and then by putting it into a press. Thus is obtained a muddy and green liquor; which generally requires to be clarified, as we shall soon observe. The juices of all plants are not extracted with equal ease. Some plants, even when fresh, contain so little juice, that water must be added while they are pounded, otherwise scarcely any juice would be obtained by expression. Other plants, which contain a considerable quantity of juice, furnish by expression but a small quantity of it, because they contain also much mucilage, which renders the juice so viscid that it cannot flow. Water must also be added to these plants to obtain their juice. The juices thus obtained from vegetables by a mechanical method, are not, properly speaking, one of their principles, but rather a collection of all the proximate principles of plants which are soluble in water; such as the saponaceous extractive matter, the mucilage, the odoriferous principle, all the saline and saccharine substances; all which are dissolved in the water of the vegetation of the plants. Besides all these matters, the juice contains some part of the refinous substance, and the green colouring matter, which in almost all vegetables is of a refinous nature. These two latter substances, not being soluble in water, are only interposed between the parts of the other principles which are dissolved in the juice, and consequently disturbs its transparency. They nevertheless adhere together in a certain degree, and so strongly in most juices, that they cannot be separated by filtration alone. When therefore these juices are to be clarified, some previous preparations must be used by which the filtration may be facilitated. Juices which are acid, and not very mucilaginous, are spontaneously clarified by rest and gentle heat. The juices of most antiscorbutic plants abounding in saline volatile principles, may be disposed to filtration merely by immersion in boiling water; and as they may be contained in closed bottles while they are thus heated in a water-bath, their saline volatile part, in which their medicinal qualities chiefly consist, may thus be preserved. Fermentation is also an effectual method of

clarifying juices which are susceptible of it; for all liquors which have fermented, clarify spontaneously after fermentation. But this method is not used to clarify juices, because many of them are susceptible of only an imperfect fermentation, and because the qualities of most of them are injured by that process. The method of clarification most generally used, and indispensably necessary for those juices which contain much mucilage, is boiling with the white of an egg. This matter, which has the property of coagulating in boiling water, and of uniting with mucilage, does accordingly, when added to the juice of plants, unite with, and coagulate, their mucilage, and separates it from the juice in form of scum, together with the greatest part of the refinous and earthy matters which disturb its transparency. And as any of these refinous matters which may remain in the liquor, after this boiling with the whites of eggs, are no longer retained by the mucilage, they may easily be separated by filtration. See **FILTRATION**.

The juices, especially before they are clarified, contain almost all the same principles as the plant itself; because in the operation by which they are extracted, no decomposition happens, but every thing remains, as to its nature, in the same state as in the plant. The principles contained in the juice are only separated from the grosser oily, earthy, and refinous parts, which compose the solid matter that remains under the press. These juices, when well prepared, have therefore the same medicinal qualities as the plants from which they are obtained. They must evidently differ from each other as to the nature and proportions of the principles with which they are impregnated, as much as the plants from which they are extracted differ from each other in those respects.

Most vegetable juices coagulate when they are exposed to the air, whether they are drawn out of the plant by wounds, or naturally run out; tho' what is called *naturally running out*, is generally the effect of a wound in the plant, from a sort of canker, or some other internal cause. Different parts of the same plant yield different juices. The same veins in their course through the different parts of the plant yield juices of a different appearance. Thus the juice in the root of the cow parsnep is of a brimstone colour; but in the stalk it is white.

Among those juices of vegetables which are clammy and readily coagulate, there are some which readily break with a whey. The great wild lettuce, with the smell of opium yields the greatest plenty of milky juice of any known British plant. When the stalk is wounded with a knife, the juice flows readily out like a thick cream, and is white and ropy; but if these wounds are made at the top of the stalks, the juice that flows out of them is dashed with a purple tinge, as if cream had been sprinkled over it with a few drops of red wine. Some little time after letting this out, it becomes much more purple, and thickens; and finally, the thicker part of it separates, and the thin whey swims at top. The whey or thin part of this separated matter is easily pressed out from the curd by squeezing between the fingers, and the curd will then remain white; and on washing with water, it becomes like rags. The purple whey, for in this is contained all the colour, soon dries into a purple cake, and

and may be crumbled between the fingers into a powder of the same colour. The white curd being dried and kept for some time, becomes hard and brittle. It breaks with a shining surface like resin, and is inflammable; taking fire at a candle, and burning all away with a strong flame. The same thick part being held over a gentle heat, will draw out into tough long threads, melting like wax. The purple cake made from the whey is quite different from this; and when held to a candle scarce flames at all, but burns to a black coal. The whole virtue of the plant seems also to consist in this thin part of its juice: for the coagulum or curd, though looking like wax or resin, has no taste at all; whereas the purple cake made from the serum is extremely bitter, and of a taste somewhat resembling that of opium.

Of the same kind with the wild lettuce are the throotwort, spurge, and many other plants. These are all replete with a milky juice which separates into curds and whey like that already described. But this, though a common law of nature, is not universal; for there are many plants which yield the like milky juices, without any separation ensuing upon their extravasation. The white juice of the *Ionchus* never separates, but dries into an uniform cake: the common red wild poppy bleeds freely with a milky juice; and the heads or capsules of seed bleed not less freely than the rest of the plant, even after the flower is fallen. This juice, on being received into a shell or other small vessel, soon changes its white to a deep yellow colour, and dries it into a cake which seems resinous and oily, but no whey separates from it. The *tragopogon*, or goat's-beard, when wounded, bleeds freely a milky juice; it is at first white, but becomes immediately yellow, and then more and more red; till at length it is wholly of a dusky red. It never separates, but dries together into one cake; and is oily and resinous, but of an insipid taste. The great bindweed also bleeds freely a white juice; the flowers, as well as the stalks and leaves, affording this liquor. It is of a sharp taste; and as many of the purging plants are of this class, it would be worth trying whether this milk is not purgative.

These juices, as well as the generality of others which bleed from plants, are white like milk; but there are some of other colours. The juice of the greatcelandine is of a fine yellow colour; it flows from the plant of the thickness of cream, and soon dries into a hard cake, without any whey separating from it. Another yellow juice is yielded by the seed-vessels of the yellow centaury in the month of July, when the seeds are full grown. This is very clammy; it soon hardens altogether into a cake without any whey separating from it. It sticks to the fingers like birdlime, is of the colour of pale amber, and will never become harder than soft wax, if dried in the shade; but if laid in the sun, it immediately becomes hard like resin. These cakes burn like wax, and emit a very pleasant smell. The great angelica also yields a yellowish juice on being wounded; and this will not harden at all, but if kept several years will still be soft and clammy, drawing out into threads, or half melted resin.

Another kind of juices very different from all these, are those of a gummy nature. Some of these remain

liquid a long time, and are not to be dried without the assistance of heat; the others very quickly harden of themselves, and are not inflammable. The gum of the juice of rhubarb-leaves soon hardens; and is afterwards soluble in common water, and sparkles when put into the flame of a candle. The clusters of the common honeysuckle are full of a liquid gum. This they frequently throw out, and it falls upon the leaves, where it retains its own form. The red hairs of the *ros folis* are all terminated by large bladders of a thin watery fluid. This is also a liquid gum; it sticks to the fingers, draws out into long threads, and stands the force of the sun all day. In the centre of each of these dew-drops there is a small red bladder, which stands immediately on the summit of the red hair, and contains a purple juice which may be squeezed out of it. The *pinguicula*, or butter-wort, has also a gummy matter on its leaves in much greater quantity than the *ros folis*.

Some plants yield juices which are manifestly of an oily nature. These, when rubbed, are not at all of a clammy nature, but make the fingers glib and slippery, and do not all harden on being exposed to the air. If the stalk of elecampane be wounded, there flows out an oily juice swimming upon a watery one. The stalks of the hemlock also afford a similar oily liquor swimming upon the other; and in like manner the white mullein, the berries of ivy, the bay, juniper, dog-berry tree, and the fruit of the olive, when wounded, shew their oil floating on the watery juice. Some of these oily juices, however, harden into a kind of resin. Our ivy yields such a juice very abundantly; and the juice of the small purple-berried juniper is of the same kind, being hard and fat, and not very gummy. If the bark of the common ivy is wounded in March, there will ooze out a tough and greasy matter of a yellowish colour, which, taken up between the fingers, feels not at all gummy or sticking, but melts in handling into a sort of oil, which, in process of time, hardens and crusts upon the wounds, and looks like brown sugar. It burns with a lasting flame, and smells very strong. The tops of the wild lettuce, and the leaves growing near the tops, if examined with a magnifying glass, shew a great number of small bladders, or drops of an oily juice of a brownish colour, hardening into a kind of resin; they are easily wiped off when of any size, and are truly an oily-juice a little hardened. It is probable also, that the fine blue flour or powder, called the *bloom*, upon the surface of our common plums, is no other than such an oily juice exuding from their pores in small particles, and hardening into a sort of resin.

JUJUBES, in the *matéria medica*, the name of a fruit of the pulpy kind, produced on a tree which *Linnaeus* makes a species of *rhamnus*. See *RHAMNUS*.

The jujubes have been made a general ingredient in pectoral decoctions; but they are now seldom used on these occasions, and are scarce at all heard of in prescription, or to be met with in our shops.

JULEP, in pharmacy, a medicine composed of some proper liquor and a syrup or sugar, of extemporaneous preparation, without decoction. See *PHARMACY*, n^o 917, &c.

JULIAN, the famous Roman emperor, styled the *Apollate*, because he professed the Christian religion

Julian.

before he ascended the throne, but afterwards openly embraced Paganism, and endeavoured to abolish Christianity. He made no use of violence, however, for this purpose; for he knew that violent measures had always rendered it more flourishing: he therefore behaved with a politic mildness to the Christians; recalled all who had been banished on account of religion under the reign of Constantius; and undertook to convert them by his caresses, and by temporal advantages and mortifications covered over by artful pretences: but he forbade Christians to plead before courts of justice, or to enjoy any public employments. He even prohibited their teaching polite literature; well knowing the great advantages they drew from profane authors in their attacks upon Paganism and irreligion. Though he on all occasions shewed a sovereign contempt for the Christians, whom he always called *Galileans*, yet he was sensible of the advantage they obtained by their virtue and the purity of their manners; and therefore incessantly proposed their example to the Pagan priests. At last, however, when he found that all other methods failed, he gave public employments to the most cruel enemies of the Christians, when the cities in most of the provinces were filled with tumults and seditions, and many of them were put to death: Though it has been pleaded by Julian's apologists, that the behaviour of the Christians furnished sufficient pretence for most of his proceedings against them, and the animosities among themselves furnished him with the means; that they were continually prone to sedition, and made a merit of insulting the public worship; and, finally, that they made no scruple of declaring, that want of numbers alone prevented them from engaging in an open rebellion. Historians mention, that Julian attempted to prove the falsehood of our Lord's prediction with respect to the temple of Jerusalem; and resolved to have that edifice rebuilt by the Jews, about 300 years after its destruction by Titus: but all their endeavours served only the more perfectly to verify what had been foretold by Jesus Christ; for the Jews, who had assembled from all parts to Jerusalem, digging the foundations, flames of fire burst forth, and consumed the workmen *. However, the Jews, who were obstinately bent on accomplishing that work, made several attempts; but it is said, that all who endeavoured to lay the foundations perished by these flames, which at last obliged them entirely to abandon the work. Julian being mortally wounded in a battle with the Persians, it is said, that he then caught in his hand some of the blood which flowed from his wound, and throwing it towards heaven, cried, "Thou Galilean hast conquered." But notwithstanding this popular report, Theodoret relates, that Julian discovered a different disposition, and employed his last moments in conversing with Maximus the philosopher, on the dignity of the soul. He died the following night, aged 32. For a particular account of his reign and exploits, see (*History of*) CONSTANTINOPLE, n^o 7. 33.—70.

* See Jerusalem.

No prince was ever more differently represented by different authors; on which account it is difficult to form a true judgement of his real character. It must, however, be acknowledged, that he was learned, liberal, temperate, brave, vigilant, and a lover of justice: but, on the other hand, he had apostatized to

Paganism; was an enemy to the Christian religion; and was, in fact, a persecutor, though not of the most sanguinary class. We have several of his discourses or orations; some of his letters; a treatise, intitled *Misopogon*, which is a satire on the inhabitants of Antioch; and some other pieces, all written in an elegant style. They were published in Greek and Latin by father Petau, in 1630, in quarto; and of which Spanheimius gave a fine edition in folio, in 1696. His most famous work was that composed against the Christians, of which there are some fragments in Cyrill's refutation of it.

JULIAN Period, in chronology, a period so called, as being adapted to the Julian year.

It is made to commence before the creation of the world. Its principal advantage lies here, that the same years of the cycles of the sun, moon, and indiction, of which three cycles it was made to consist by Joseph Scaliger in 1580, belonging to any year of this period, will never fall together again till after the expiration of 7980 years. There is taken for the first year of this period that which hath the first of the cycle of the sun, the first of the cycle of the moon, and the first of the indiction cycle, and so reckoning on.

The first year of the Christian era is always, in our systems of Chronology, the 4714th of the Julian period.

To find what year of the Julian period any given year of Christ answers to; To the given year of Christ add 4713, because so many years of the Julian period were expired A. D. 1; and the sum gives the year of the Julian period sought.

On the contrary, having the year of the Julian period given, to find what year of Christ answers thereto; From the year of the Julian period given subtract 4713, and the remainder will be the year sought.

JULIAN (St.), a harbour on the south of Patagonia, in South America, where ships usually touch that are bound to the south seas. S. Lat. 48. 15.

JULIERS, a duchy in the circle of Westphalia, in Germany, seated between the rivers Maese and Rhine, and bounded by Prussian Guelderland on the north, by the electorate of Triers on the south, by the electorate of Cologne on the east, and by the Netherlands on the west. It is about 60 miles long, and 30 broad; and is a very plentiful country, abounding in cattle, corn, and fine meadows, and is well supplied with wood; but it is most remarkable for a fine breed of horses, and woad for dying, which is gathered here in abundance. The chief towns are Juliers, Aix-la-Chapelle, Duren, Munster-Eifel, Bedbur, Wesenburgh, and Lafteren. It is subject to the elector Palatine, with the consent of the kings of Prussia and Poland.

JULIERS, a city, capital of the duchy of Juliers in Westphalia; some think this city was founded by Julius Cæsar, or Julia Agrippina; but this is much questioned by others, because it is not mentioned before Antoninus's Itinerary and Theodosius's Tables. The town is small, but well fortified, and neatly built; the houses are of brick, and the streets broad and regular. The citadel is large and very strong, containing a palace of the ancient dukes, and a spacious piazza. In the suburbs there is a monastery of Carthusians, nobly

Julian.
Juliers.

Julio

Juncus.

nobly endowed by several dukes of Juliers. The town is but poorly inhabited, though they have a fine woolen manufactory in this country, and likewise another of linen. It was taken by Prince Maurice of Nassau in 1610, and by the Spaniards in 1622. It is seated on the river Roer, in E. Lon. 6. 35. N. Lat. 50. 55.

JULIO ROMANO. See ROMANO.

JULIUS CESAR. See CESAR.

JULIUS II. (Julian de la Rovere) pope, remarkable for his warlike disposition, and his political negotiations: by the latter, he engaged the principal powers of Europe to league with him against the republic of Venice, called the *league of Cambray*, signed in 1508. The Venetians having purchased peace by the cession of part of Romania, Julius turned his arms against Louis XII. king of France, and appeared in person, armed cap-a-pie, at the siege of Mirandola; which place he took by assault in 1511. But proceeding to excommunicate Louis, the king wisely turned his own weapons against him, by calling a general council at Pisa: at which the pope refusing to appear, was declared to be suspended from the holy see; and Louis, in his turn, excommunicated the pope, who died soon after in 1512. He built the famous church of St Peter at Rome, and was a patron of the polite arts.

JULIUS POLLUX. See POLLUX.

JULY, the seventh month of the year; during which the sun enters the sign Leo. The word is derived from the Latin *Julius*, the surname of C. Caesar the dictator, who was born in it. Mark Antony first gave this month the name *July*, which before was called *Quintilis*, as being the fifth month of the year in the old Roman kalendar established by Romulus, which begun in the month of March. For the same reason, August was called *Sextilis*; and September, October, November, and December, still retain the name of their first rank:

Que sequitur, numero turba notata suo. OVID. Fast.

On the 19th day of this month the dog-days are commonly supposed to begin; when, according to Hippocrates and Pliny, the fea boils, wine turns sour, dogs go mad, the bile is increased and irritated, and all animals decline and languish.

JUMIEGE, a town of Normandy, in France, and in the territory of Caux, with a celebrated Benedictine abbey. It is seated on the river Seine, in E. Lon. 0. 55. N. Lat. 49. 25.

JUNCTURE, in composition, See ORATORY, n° 46.

JUNCUS, the RUSH; a genus of the monogynia order, belonging to the hexandria class of plants. There are many species, which are universally known, being very troublesome weeds, and difficult to be eradicated. The pith of two kinds, called the *conglomeratus* and *effusus*, or round-headed and soft rushes, are used for wicks to lamps and rush-lights. The *conglomeratus*, and *aculus* or marine rush, are planted with great care on the banks of the sea in Holland, in order to prevent the water from washing away the earth; which would otherwise be removed every tide, if it were not for the roots of those rushes, which fasten very deep in the ground, and mat themselves near the surface in such a manner as to hold the earth closely together. Therefore, whenever the inhabitants

perceive that the roots of these rushes are destroyed, they are very assiduous in repairing them. In the summer-time, when the rushes are fully grown, they are cut and tied up in bundles, which are dried, and afterwards carried into the larger towns and cities, where they are wrought into baskets, and several other useful things, which are frequently sent into England. These sorts do not grow so strong in this country as on the Maese, where they sometimes arrive at the height of four feet and upwards.

A species of rush termed *juncus odoratus*, "sweet rush, or camel's hay," is sometimes brought to us from Turkey and Arabia, tied up in bundles about a foot long. The stalk, in shape and colour, somewhat resembles a barley-straw; it is full of fungous pith like that of our common rushes: the leaves are like those of wheat, and surround the stalk with several coats, as in the reed. The flowers are of a carnation colour, striped with a lighter purple. The whole plant, when in perfection, has a hot, bitterish, not unpleasant, aromatic taste, and a very fragrant smell: by long keeping it loses greatly its aromatic flavour. Distilled with water, it yields a considerable quantity of an essential oil. It was formerly often used in medicine as an aromatic, and in obstructions of the viscera, &c. but is very little employed at present.

JUNE, the sixth month of the year, during which the sun enters the sign of Cancer. The word comes from the Latin *Junius*, which some derive à *Junone*. Ovid, in the 6th of his *Fasts*, makes the goddess say,

Junius à nostro nomine nomen habet.

Others rather derive it à *junioribus*, this being for young people, as the month of May was for old ones. *Junius est juvenum, qui suit ante senum.* In this month is the summer solstice.

JUNGERMANNIA, a genus of the order of algæ, belonging to the cryptogamia class of plants. There are 29 species, all natives of Britain, growing in woods, shady places, by the sides of ditches, &c. Many of them are beautiful objects for the microscope.

JUNIPERUS, the JUNIPER TREE; a genus of the monadelphica order, belonging to the dioecia class of plants.

Species. 1. The *communis*, or common juniper, grows naturally in many parts of Britain, upon dry barren commons, where it seldom rises above the height of a low shrub. Mr Evelyn assures us, that "the juniper, though naturally of the growth of England, is very little known in many parts of the country: for it grows naturally only in dry, chalky, or sandy land; and, where the soil is opposite to this, the plant is rarely found. Those who have been used to see it in its wild state, on sandy barren commons, &c. will have little inducement to plant it; as there they will see it procumbent, seldom shewing a tendency to aspire: but when planted in a good soil, it will rise to the height of 15 or 16 feet, and produce numerous branches from the bottom to the top, forming a well-looking bushy plant. These branches are exceeding tough, and covered with a smooth bark of a reddish colour, having a tinge of purple. The leaves are narrow and sharp-pointed, growing by threes on the branches: their upper surface has a greyish streak down the middle; but

June

Juniperus.

branchy the whole length, with the branches growing more erect, and leaves, flowers, and fruit, like the former. But Mr Miller affirms the Swedish juniper to be a distinct species. A prostrate and very dwarfish variety is mentioned by Mr Lightfoot, under the name of *dwarf Alpine juniper*. It is frequently found in the mountains in the highlands of Scotland, and has broader and thicker leaves than the former; the berries are also larger, or more oval than spherical. 2. The *oxycedrus*, or Spanish juniper, rises from 10 to 15 feet high, closely branched from bottom to top; having short, awl-shaped, spreading leaves by threes, and small dioecious flowers, succeeded by large reddish-brown berries. 3. The *thurifera*, or blue-berried Spanish juniper, grows 20 feet high or more, branching in a conic form, with acute imbricated leaves growing by fours, and small dioecious flowers, succeeded by large blue flowers. 4. The *Virginiana*, or Virginia cedar, grows 30 or 40 feet high, branching from bottom to top in a conic manner, small leaves by threes adhering at their base; the younger ones imbricated, and the old ones spreading; with dioecious flowers, succeeded by small blue berries. 5. The *Lycia*, or Lycian cedar, grows 20 feet high, branching erect; garnished with small obtuse oval leaves, every-where imbricated; having dioecious flowers, succeeded by large oval brown berries. It is a native of Spain and Italy. 6. The *Phœnicia*, or Phœnician cedar, grows about 20 feet high, branching pyramidally; adorned with ternate and imbricated obtuse leaves; and dioecious flowers, succeeded by small yellowish berries. It is a native of Portugal. 7. The *Bermudiana*, or Bermudian cedar, grows 20 or 30 feet high, has small acute leaves by threes below, the upper ones awl-shaped, acute, and decurrent, by pairs or fours, spreading outward, and dioecious flowers, succeeded by purplish berries. It is a native of Bermudas. 8. The *Sabina*, or savin tree; of which there are the following varieties, viz. spreading, upright, and variegated savin. The first grows three or four feet high, with horizontal and very spreading branches; with short, pointed, decurrent, erect, opposite leaves; and dioecious flowers, succeeded by bluish berries, but very rarely producing either flowers or fruit. The second grows eight or ten feet high, with upright branches, dark-green leaves like the former, and dioecious flowers, succeeded by plenty of berries. The third has the ends of many of the shoots and young branches variegated with white, and the leaves finely striped; so that it makes a beautiful appearance.

Culture. The propagation of all the junipers is by seed, and of the savins by layers and cuttings; but these last may also be raised from the berries, if they can be procured. They may all be sowed in beds of common light earth; except the cedar of Bermudas, which must be sowed in pots, to have shelter in winter. When the hardy kinds have had two or three years growth in the seed-bed, they may be planted out in autumn or in spring, in nursery-rows two feet asunder,

there to remain till of due size for final transplantation into the shrubbery. The Bermudas cedar must be sheltered under a frame for the first year or two; when they must be separated into small pots, to be sheltered also in winter for three or four years, till they have acquired some size and strength; then turned out into pots in the full ground, where they are to remain in a warm situation; though a shelter of mats for the first winter or two during hard frosts will be of great service. The season for transplanting all the sorts is either in autumn, October or November, or in March, and early in April.

Uses, &c. Juniper-berries have a strong, not disagreeable smell; and a warm, pungent, sweet taste; which, if they are long chewed, or previously well bruised, is followed by a bitterish one. The pungency seems to reside in the bark; the sweet in the juice; the aromatic flavour in oily vesicles spread through the substance of the pulp, and distinguishable even by the eye; and the bitter in the seeds. The fresh berries yield, on expression, a rich, sweet, honey-like aromatic juice; if previously pounded so as to break the seeds, the juice proves tart and bitter.—These berries are useful carminatives and stomachics: for these purposes a spirituous water and essential oil are prepared from them, and they are also ingredients in various medicines. The liquor remaining after the distillation of the oil passed through a strainer, and gently exhaled to the consistence a rob, proves likewise a medicine of great utility, and in many cases is perhaps preferable to the oil or the berry itself. Hoffman is expressly of this opinion, and recommends the rob of juniper in debility of the stomach and intestines, and says it is particularly serviceable to old people who are subject to these disorders, or labour under a difficulty with regard to the urinary secretion. This rob is of a dark brownish-yellow colour, a balsamic sweet taste, with a little of the bitter, more or less, according as the seeds in the berry have been more or less bruised. The Swedes prepare an extract from the berries, probably of the nature of the rob above mentioned, which some people eat for breakfast. In Germany the berries are bruised and put into the fauce made use of for a wild boar; and are frequently also eaten with other pork, to give it a wild-boar flavour. In Carniola and some other districts, the inhabitants make a kind of wine of them steeped in water; but it is difficult to prevent this liquor from growing sour. Thrushes and grouse feed on the berries, and disseminate the seed in their dung.—It is remarkable that the berries of the juniper are two years in ripening. They sometimes appear in an uncommon form; the leaves of the cup grow double the usual size, approaching, but not closing; and the three petals fit exactly close, so as to keep the air from the *tipule juniperi* which inhabit them.—The whole plant has a strong aromatic smell. The wood when burnt emits a fragrant odour like incense. It is of a reddish colour, very hard and durable; and, when large enough, is used in marquetry and vaneeing, and in making cups, cabinets, &c. From the clefts of the bark, in warm climates, there sometimes exudes a resinous gum called by the Arabs *Sandaracha* *. This resin, or as it is * See Sandaracha. improperly called gum, is brought to us from Africa, where

where the trees grow very large, and in great numbers.—Grafts will not grow beneath juniper, but this tree itself is said to be destroyed by the meadow-oat. The oil of juniper mixed with that of nuts makes an excellent varnish for pictures, wood-work, and preserving iron from rusting. The resin powdered and rubbed into paper prevents the ink from sinking through it, for which it is frequently used under the name of *POUNCE*.—The charcoal made from this wood endures longer than any other, inasmuch that live embers are said to have been found in the ashes, after being a year covered.

JUNIUS (Adrian), one of the most learned men of the age in which he lived, was born at Horn in Holland in 1511. He travelled into all parts of Europe, and practised physic with reputation in England; where, among other works, he composed a Greek and Latin Lexicon, to which he added above 6500 words; an Epithalamium on the marriage of queen Mary with king Philip of Spain; and *Animadversa & de Coma Commentarius*, which is the most applauded of all his works. He died in 1575.

JUNIUS (Francis), professor of divinity at Leyden, was born at Bourges in 1545, of a noble family, and studied some time at Lyons. Bartholomew Aneau, who was principal of the college in that city, gave him excellent instructions with regard to the right method of studying. He was remarkable for being proof against all temptations to lewdness; but a libertine too far overpowered him by his sophistry, that he made him an atheist: however, he soon returned to his first faith; and, averse as he was to unlawful love, he had no aversion to matrimony, but was married no less than four times. He was employed in public affairs by Henry IV.; and at last was invited to Leyden to be professor of divinity, which employment he discharged with honour, till he was snatched away by the plague in 1602. Du Pin says, he was a learned and judicious critic. He wrote, in conjunction with Emmanuel Tremellius, a Latin version of the Hebrew text of the Bible. He also published Commentaries on a great part of the Holy Scriptures; and many other works, all in Latin.

JUNIUS (Francis), or *Francis du Jon*, the son of the preceding, was born at Heidelberg, in 1589. He at first designed to devote himself to a military life; but after the truce concluded in 1609, he applied himself entirely to study. He came to England in 1620, and lived 30 years in the earl of Arundel's family. He was greatly esteemed, not only for his profound erudition, but also for the purity of his manners; and was so passionately fond of the study of the Northern languages, that, being informed there were some villages in Friesland where the ancient language of the Saxons was preserved, he went and lived two years in that country. He returned to England in 1675; and after spending a year at Oxford, retired to Windsor, in order to visit Vossius, at whose house he died in 1677. The university of Oxford, to which he bequeathed his manuscripts, erected a very handsome monument to his memory. He wrote, 1. *De Pictura Veterum*, which is admired by all the learned; the best edition of it is that of Rotterdam in 1694. He published the same work at Lon-

don, in English. 2. An explication of the old Gothic manuscript, called the *Silver one*, because the four Gospels are there written in silver Gothic letters; this was published with notes by Thomas Marechal, or Marthal. 3. A large Commentary on the Harmony of the four Gospels by Tatian, which is still in manuscript. 4. A Glossary in five languages, in which he explains the origin of the Northern languages; published at Oxford in 1745, in folio, by Mr Edward Lee.

JUNK, in the sea-language, old cables cut into short pieces, and given to boatwains for making swabs, plats, and nippers; as also to the ship-carpenters, and to poor people, to be pricked into oakum, for caulking ships, &c.

JUNO, in pagan worship, was the sister and wife of Jupiter, and the goddess of kingdoms and riches; and also styled the *queen of heaven*: she presided over marriage and child-birth, and was represented as the daughter of Saturn and Rhea. She married Jupiter; but was not the most compliant wife; for, according to Homer, that god was sometimes obliged to make use of all his authority to keep her in due subjection; and the same author observes, that on her entering into a conspiracy against him, he punished her by suspending her in the air with two anvils fastened to her feet, and golden manacles on her hands, which all the other deities looked on without a possibility of helping her. However, her jealousy made her frequently find opportunities of interrupting her husband in the course of his amours, and prompted her to punish with unrelenting fury Europa, Semele, Io, Latona, and the rest of his mistresses. Jupiter himself having conceived without any commerce with a female, Juno, in revenge, conceived Vulcan by the wind, Mars by touching a flower pointed out to her by the goddess Flora, and Hebe by eating greedily of lettuces.

Juno, as the queen of heaven, preferred great state: her usual attendants were Terror and Boldness, Castor, Pollux, and 14 nymphs; but her most faithful attendant was the beautiful Iris, or the rainbow. Homer describes her in a chariot adorned with precious stones, the wheels of which were of ebony, and which was drawn by horses with reins of gold. But she is more commonly painted drawn by peacocks. She was represented in her temple at Corinth, seated on a throne, with a crown on her head, a pomegranate in one hand, and in the other a sceptre with a cuckoo on its top. This statue was of gold and ivory.

Some mythologists suppose, that Juno signifies the air: others, that she was the Egyptian Isis; who being represented under various figures, was by the Greeks and Romans represented as so many distinct deities.

JUNTO, in matters of government, denotes a select council for taking cognizance of affairs of great consequence, which require secrecy.

In Spain and Portugal, it signifies much the same with convention, assembly, or board among us: thus we meet with the *junto* of the three estates, of commerce, of tobacco, &c. See **BOARD**, &c.

IVORY, in natural history, &c. a hard, solid, and firm substance, of a white colour, and capable of a very good polish. It is the tusk of the elephant*; and is hollow from the base to a certain height, the cavity being filled up with a compact medullary substance, * See *Elephant*.
seeming

seeming to have a great number of glands it it. It is observed, that the Ceylon ivory, and that of the island of Achem, do not become yellow in the wearing, as all other ivory does; for this reason the teeth of these places bear a larger price than those of the coast of Guinea.

Hardening, Softening, and Staining, of IVORY. See BONES and HORNS.

JUPITER, in pagan worship, the greatest of their deities, was the son of Saturn and Rhea. That goddess perceiving that her husband devoured her children as fast as she brought them forth; and being in pain for Jupiter, she substituted a stone in his room, which Saturn immediately swallowed. He was educated on mount Ida by the Corybantes. Virgil tells us, that he was fed by the bees; out of gratitude for which, he changed them from an iron to a golden colour. Some say, that his nurses were Amalthæa and Melissa, who gave him goats milk and honey; and others, that Amalthæa was the name of the goat which nourished him, and which, as a reward for her great services, was changed into a constellation. According to others, he was fed by wild pigeons, who brought him ambrosia from Oceanus; and by an eagle, who carried nectar in his beak from a steep rock: for which he rewarded the former, by making them the foretellers of winter and summer; and the last, by giving him immortality, and making him his thunderbearer. When grown up, he defeated the Titans, dethroned his father Saturn, and divided his kingdom with his two brothers; Jupiter had the earth, Neptune the sea, and Pluto hell. Jupiter had several wives: the first of whom, named *Metis*, he is said to have devoured when big with child, by which he himself became pregnant; and Minerva issued out of his head, completely armed and fully grown. His second was Themis; the name of his third is not known; his fourth was the celebrated Juno, whom he deceived under the form of a cuckoo, which to shun the violence of a storm fled for shelter to her lap. He was the father of the Muses and Graces; and had a prodigious number of children by his mistresses. He metamorphosed himself into a satyr to enjoy Antiope; into a bull, to carry off Europa; into a swan, to abuse Leda; into a shower of gold, to corrupt Danaë; and into several other forms to gratify his passions. He had Bacchus by Semele, Pallas by Thetis, Diana and Apollo by Latona; and was the father of Mercury and the other gods.

He had a multiplicity of names, either from the places where he was worshipped, or the attributes ascribed to him; and is usually represented seated on a throne of ivory or gold, surrounded with clouds, vested in a purple robe, grasping his thunder in the right hand and holding a sceptre in his left, with the eagle at his feet.

The ridiculous stories which the poets had published concerning this god, served as a foundation to the religion of the heathens; but some persons of a graver character endeavour to explain them, either by allegories, or the principles of natural philosophy.

JURA, one of the Hebrides, or Western Islands of Scotland, lying opposite to Knapdale in Argyleshire, is supposed to be about 34 miles long, and 10 broad. It is the most rugged of all the Hebrides; and is com-

posed chiefly of vast mountains, naked, and without a possibility of cultivation. Some of the south and western sides only are improvable, and in good seasons as much bear and oats are raised as will maintain the inhabitants; though by the distillation, as Mr Pennant supposes, of their grain, they sometimes want. Bear produces four or five fold, and oats three fold. Sloes are the only fruits of the island. An acid for punch is here made from the berries of the mountain-ash; and a kind of spirit is also distilled from them. Necessity hath instructed the inhabitants in the use of native dyes. Thus, the juice of the tops of heath boiled, supplies them with a yellow; the roots of the white water-lily, with a dark-brown; those of the yellow water-lily, with a black; and the gallum verum, *ru* of the islanders, with a very fine red, not inferior to madder. On the hills is some pasture for cattle; and the produce, when Mr Pennant visited the island, amounted to about 300 or 400 head of black cattle, sold annually, at 3l. each, to graziers who come for them; about 100 horses, also sold annually; a few sheep with fleeces of a most excellent quality, and great numbers of goats. The other animals of Jura are about 100 stags; though these must formerly have been much more numerous, as the original name of the island was *Deir-ay*, or the *isle of deer*, so called by the Norwegians on account of the abundance of deer found in it. Here also Mr Pennant had some obscure account of a worm that, in a less pernicious degree, resembles the *furia infernalis* * of Linnaeus. The *fillan*, a little worm of Jura, small as a thread, and not an inch in length, insinuates itself under the skin, causes a redness and great pain, flies swiftly from place to place; but is cured by a poultice of cheese and honey. Of the mountains of Jura, those from their shape called the *paps*, are the most remarkable. There are only three very large ones; the biggest, called *Beinn-an-oir*, or the mountain of gold, lies farthest to the north; the second is called *Beinn-sheunta*, or the *ballowed mountain*; and the third, *Beinn-a-chaolais*, or the *mountain of the sound*, is the least of the three. Mr Pennant ascended the first with great labour and difficulty. It is composed of vast stones, covered with mosses near the base; but all above, bare and unconnected with each other. The whole, he says, seems a *cairn*, the work of the sons of Saturn. The grandeur of the prospect from the top abundantly made amends for the fatigue of ascending the mountain. Jura itself afforded a stupendous scene of rock, varied with innumerable little lakes. From the west side of the hill ran a narrow stripe of rock terminating in the sea, and called the *slide of the old hag*. To the south appeared Ilay extended like a map beneath his feet; and beyond that the north of Ireland; to the east two other islands, Cantyre, Arran, and the frith of Clyde bounded by Ayrshire; an amazing tract of mountains to the north-east as far as *Ben-lomond*; *Skarba* finished the northern view; and over the western ocean were scattered Colonsay and Oransay, Mull, Iona, and its neighbouring isles; and still further, the long extents of Tirey and Col, just apparent. The other paps are seen very distinctly, but all of them inferior in height. Mr Banks and his friends mounted that to the south, and found the height to be 2359 feet; but this is far overtopped by *Beinn-an-oir*. The stones of this mountain are

* See *Furia*, in the APPENDIX.

white, a few red, quartz, and composed of small grains; but some are *brecciated*, or filled with crystalline kernels of an amethystine colour. The other stones of the island are, a cinerous slate, veined with red, and used here as a whet-stone; a micaceous sand-stone; and between the small isles and Ardfin, a micaceous quartz rock-stone. On the west side of the island there is an anchoring-place called *Whitfarlan*; towards the north end is a bay called *Da'f yaul*; and on the same coast is formed another riding-place for vessels among several small islands. Between the north end of Jura and the small isle of Skarba, there is a famous whirlpool, called *Cory-Vrekan*, from Breacan, son to a king of Denmark, who perished in this gulph. His body being cast ashore on the north side of Jura, was buried in a cave, and his grave is still distinguished by a tombstone and altar. In this vortex, which extends about a mile in breadth, the sea begins to boil and ferment with the tide of flood, increasing gradually to a number of whirlpools, which, in the form of pyramids, spout up the water with a great noise, as high as the mast of a small vessel, agitated into such a foam as makes the sea appear white even at the distance of two leagues. About half flood the violence begins to decrease, and continues to do so till about half an hour after high-water: then it boils as before, till within an hour of low-water, when the smallest fishing-boat may cross it without danger.

Jura is furnished with many rivulets and springs of excellent water, and the air is remarkably healthy; its salubrity being increased by the high situation, perpetually fanned by breezes. It is, however, but ill-peopled; and did not contain above 700 or 800 inhabitants at the time it was visited by Mr Pennant. The women are prolific, and very often bear twins. The inhabitants live to a great age, and are liable to few distempers. Men of 90 can work; and there was then living a woman of 80, who could run down a sheep. Then inhabitants are all Protestants, but addicted to some superstitions. The parish is supposed to be the largest in Great Britain, and the duty the most dangerous and troublesome: it consists of Jura, Oranay, Colonsay, Skarba, and several little isles divided by narrow and dangerous sounds; forming a length of not less than 60 miles; supplied by only one minister and an assistant.

The very old-clans of Jura are the *Mac-ilvays*, and the *Mac-rainers*: but it seems to have changed masters more than once. In 1549, Donald of Cantyre, Macguillayne of Doward, Macguillayne of Kinloch-buy, and Mac-duffie of Colonsay, were the proprietors: Mac-lean of Mull had also a share in 1586. At present it belongs to the duke of Argyle, Mr Maeneil of Colonsay, and Mr Campbell of Shawfield.

IVREA, an ancient and strong town of Italy, in Piedmont, and capital of Canaveze, with a strong fort, a bishop's see, the title of a marquise, and an ancient castle. It is subject to the king of Sardinia, and seated on the river Doria between two hills, in E. Long. 7. 48. N. Lat. 45. 12.

JURIEU (Peter), an eminent French Protestant divine, called ironically by the papists the *Goliath* of the Protestants, was born in 1637. He was educated in England under his maternal uncle Peter du Moulin, and took orders in the English church: but, returning

to succeed his father as pastor of a reformed congregation at Mer in the diocese of Blois, he was made professor of divinity and Hebrew at Sedan, where he acquired great reputation. This university being taken from the Protestants, a professorship of divinity was founded for him at Rotterdam; and he was also appointed minister of the Walloon church in the same town: being now in a place of liberty, he gave full scope to an imagination naturally warm, and applied himself to study the book of Revelation, of which he fancied he had by a kind of inspiration discovered the true meaning; a notion that led him to many enthusiastic conjectures. He was moreover so unfortunate as to quarrel with his best friends for opposing his visionary opinions, which produced violent disputes between him and Messrs Bayle and de Beauval. He died in 1713; and left a great number of esteemed works behind him.

JURISCONSULTUS, (*ICtus*), among the Romans, was a person learned in the law; a master of the Roman jurisprudence; who was consulted on the interpretation of the laws and customs, and on the difficult points in law-suits. The fifteen books of the digests were compiled wholly from the answers or reports of the ancient jurisconsulti. Tribonianus, in destroying the 2000 volumes from whence the code and digest were taken, has deprived the public of a world of things, which would have given them light into the ancient office of the jurisconsulti. We should scarce have known any thing beyond their bare names, had not Pomponius, who lived in the second century, taken care to preserve some circumstances of their office.

The Roman jurisconsulti seem to have been the same with our chamber-counsellors, who arrived at the honour of being consulted, through age and experience, but never pleaded at the bar. Their pleading advocates, or lawyers, never became jurisconsulti. See ADVOCATE.

In the times of the commonwealth, the advocati had by much the more honourable employment, as being in the ready way to attain the highest preferments. They then despised the jurisconsulti, calling them in derision *formularii* and *legulei*, as having invented certain forms and monosyllables, in order to give their answers the greater appearance of gravity and mystery. But in process of time they became so much esteemed, that they were called *prudentes* and *sapientes*, and the emperors appointed the judges to follow their advice. Augustus advanced them to be public officers of the empire; so that they were no longer confined to the petty councils of private persons.—Bern. Rutilius has written the lives of the most famous jurisconsulti who have lived within these 2000 years.

JURISPRUDENCE, the science of what is just or unjust; or the knowledge of laws, rights, customs, statutes, &c. necessary for the administration of justice. See LAW.

JURY, a certain number of men sworn to inquire into and try a matter of fact, and to declare the truth upon such evidence as shall appear before them.

Juries are, in these kingdoms, the supreme judges in all courts and in all causes in which either the life, property, or reputation, of any man is concerned: this is the distinguishing privilege of every Briton, and one

Jury
Justel.

of the most glorious advantages of our constitution; for as every one is tried by his peers, the meanest subject is as safe and as free as the greatest. See the article TRIAL.

JURY-MAST, whatever is set up in room of a mast that has been lost in a storm or in an engagement, and to which a lesser yard, ropes, and sails, are affixed.

JUS CORONÆ. See HEREDITARY Right, and SUCCESSION.

Jus Deliberandi, in Scots law, that right which an heir has, by law, of deliberating for a certain time whether he will represent his predecessor. See LAW, N° clxxx. 23.

Jus Devolutum, in Scots law, the right of the church, of presenting a minister to a vacant parish, in case the patron shall neglect to use that right within the time limited by law. See LAW, N° clix. 9.

Jus Mariti, in Scots law, the right the husband acquires to his wife's moveable estate, in virtue of the marriage. See LAW, N° clx. 7.—11.

Jus Relictæ, in Scots law, the right the wife has in the goods in communion, in case of the previous decease of the husband. See LAW, *ibid*.

Jus Præventivis, in Scots law, the preferable right of jurisdiction acquired by a court, in any cause to which other courts are equally competent, by having exercised the first act of jurisdiction. See LAW, N° clvi. 5.

JUST, a sportive kind of combat on horseback, man against man, armed with lances. The word is by some derived from the French *jouffe*, of the Latin *juxta*, because the combatants fought near one another. Salmassius derives it from the modern Greek *zoustra*, or rather *zeugma*, which is used in this sense by Nicephorus Gregorius. Others derive it from *jussa*, which in the corrupt age of the Latin tongue was used for this exercise, by reason it was supposed a more just and equal combat than the tournament.

The difference between jists and tournaments consists in this, that the latter is the genus, of which the former is only a species. Tournaments included all kinds of military sports and engagements made out of gallantry and diversion: Jists were those particular combats where the parties were near each other, and engaged with lance and sword. Add, that the tournament was frequently performed by a number of cavaliers, who fought in a body: The jist was a single combat of one man against another.—Though the jists were usually made in tournaments, after a general encounter of all the cavaliers, yet they were sometimes singly, and independent of any tournament. See TOURNAMENT.

He who appeared for the first time at a jist, forfeited his helm or casque, unless he had forfeited before at a tournament.

JUSTEL (Christopher), a learned counsellor, and secretary to the French king, was born at Paris, in 1580, and applied himself to the study of ecclesiastical history. He maintained a correspondence with the most learned men of his time, as archbishop Usher, Sir Henry Spelman, Blondel, &c. till his death, which happened in 1649. He wrote, 1. The code of the canons of the church universal, and the councils of Africa, with notes. 2. A genealogical history of the house of Auvergne. And, 3. Collections of Greek

and Latin canons, from several manuscripts, which formed the *Bibliotheca juris canonici veteris*, published in 2 vols folio, by William Voet and our author's son.

JUSTEL (Henry), son of the foregoing, was born at Paris in 1620. He became secretary and counsellor to the king; and was as distinguished for his own learning, as remarkable for encouraging it in others. He came to London in 1681, on the persecution of the Protestants; and was made keeper of the royal library at St James's: which office he held till his death in 1693, when he was succeeded by the famous Dr Bentley. He wrote several books, the titles of which may be seen in the Catalogue of the Bodleian library.

JUSTICE, in a moral sense, is one of the four cardinal virtues, which gives every person his due.

JUSTICE, in a legal sense, a person deputed by the king to administer justice to his subjects, whose authority arises from his deputation, and not by right of magistracy.

Fountain of JUSTICE, one of the characters or attributes of the king. See PREROGATIVE.

By the fountain of justice the law does not mean the *author* or *original*, but only the *distributor*. Justice is not derived from the king, as from his *free gift*; but he is the steward of the public, to dispense it to whom it is *due*. He is not the spring, but the reservoir; from whence right and equity are conducted, by a thousand channels, to every individual. The original power of judicature, by the fundamental principles of society, is lodged in the society at large: but as it would be impracticable to render complete justice to every individual, by the people in their collective capacity, therefore every nation has committed that power to certain select magistrates, who with more ease and expedition can hear and determine complaints; and in England this authority has immemorially been exercised by the king or his substitutes. He therefore has alone the right of erecting courts of judicature: for, though the constitution of the kingdom hath entrusted him with the whole executive power of the laws, it is impossible, as well as improper, that he should personally carry into execution this great and extensive trust: it is consequently necessary, that courts should be erected, to assist him in executing this power; and equally necessary, that, if erected, they should be erected by his authority. And hence it is, that all jurisdictions of courts are either mediately or immediately derived from the crown, their proceedings run generally in the king's name, they pass under his seal, and are executed by his officers.

It is probable, and almost certain, that in very early times, before our constitution arrived at its full perfection, our kings in person often heard and determined causes between party and party. But at present, by the long and uniform usage of many ages, our kings have delegated their whole judicial power to the judges of their several courts; which are the grand depository of the fundamental laws of the kingdom, and have gained a known and stated jurisdiction, regulated by certain and established rules, which the crown itself cannot now alter but by act of parliament. And, in order to maintain both the dignity and independence of the judges in the superior courts, it is enacted by the statute 13 W. III. c. 2. that their commissions

missions shall be made (not, as formerly, *durante bene placito*, but) *quandiu bene se gesserint*, and their salaries ascertained and established; but that it may be lawful to remove them on the address of both houses of parliament. And now, by the noble improvements of that law in the statute of 1 Geo. III. c. 23. enacted at the earnest recommendation of the king himself from the throne, the judges are continued in their offices during their good behaviour, notwithstanding any demise of the crown (which was formerly held immediately to vacate their seats), and their full salaries are absolutely secured to them during the continuance of their commissions; his majesty having been pleased to declare, that "he looked upon the independence and uprightness of the judges, as essential to the impartial administration of justice; as one of the best securities of the rights and liberties of his subjects; and as most conducive to the honour of the crown."

In criminal proceedings, or prosecutions for offences, it would still be a higher absurdity, if the king personally sat in judgment; because in regard to these he appears in another capacity, that of *prosecutor*. All offences are either against the king's peace, or his crown and dignity; and are so laid in every indictment. For though in their consequences they generally seem (except in the case of treason and a very few others) to be rather offences against the kingdom than the king; yet, as the public, which is an invisible body, has delegated all its power and rights, with regard to the execution of the laws, to one visible magistrate, all affronts to that power, and breaches of those rights, are immediately offences against him, to whom they are so delegated by the public. He is therefore the proper person to prosecute for all public offences and breaches of the peace, being the person injured in the eye of the law. And this notion was carried so far in the old Gothic constitution, (wherein the king was bound by his coronation oath to conserve the peace), that in case of any forcible injury offered to the person of a fellow-subject, the offender was accused of a kind of perjury, in having violated the king's coronation oath; *dicebatur fregisse juramentum regis juratum*. And hence also arises another branch of the prerogative, that of *pardoning* offences; for it is reasonable, that he only who is injured should have the power of forgiving. See PARDON.

In this distinct and separate existence of the judicial power, in a peculiar body of men, nominated indeed, but not removable at pleasure, by the crown, consists one main preservative of the public liberty; which cannot subsist long in any state, unless the administration of common justice be in some degree separated both from the legislative and also from the executive power. Were it joined with the legislative, the life, liberty, and property, of the subject would be in the hands of arbitrary judges, whose decisions would be then regulated only by their own opinions, and not by any fundamental principles of law; which, though legislators may depart from, yet judges are bound to observe. Were it joined with the executive, this union might soon be an over-balance for the legislative. For which reason, by the statute of 16 Car. I. c. 10. which abolished the court of star-chamber, effectual care is taken to remove all judicial power out of the hands of the king's privy-council; who, as then was evident

from recent instances, might soon be inclined to pronounce that for law, which was most agreeable to the prince or his officers. Nothing therefore is more to be avoided in a free constitution, than uniting the provinces of a judge and a minister of state. And indeed, that the absolute power, claimed and exercised in a neighbouring nation, is more tolerable than that of the eastern empires, is in a great measure owing to their having vested the judicial power in their legislatures, a body separate and distinct from both the legislative and executive: and, if ever that nation recovers its former liberty, it will owe it to the efforts of those assemblies. In Turkey, where every thing is centered in the sultan or his ministers, despotic power is in its meridian, and wears a more dreadful aspect.

A consequence of this prerogative is the legal ubiquity of the king. His majesty, in the eye of the law, is always present in all his courts, though he cannot personally distribute justice. His judges are the mirror by which the king's image is reflected. It is the regal office, and not the royal person, that is always present in court, always ready to undertake prosecutions, or pronounce judgment, for the benefit and protection of the subject. And from this ubiquity it follows, that the king can never be nonsuit; for a nonsuit is the desertion of the suit or action by the non-appearance of the plaintive in court. For the same reason also, in the forms of legal proceedings, the king is not said to appear by his attorney, as other men do; for he always appears, in contemplation of law, in his own proper person.

From the same original, of the king's being the fountain of justice, we may also deduce the prerogative of issuing proclamations, which is vested in the king alone. See PROCLAMATION.

JUSTICIA, MALABAR-NUT; a genus of the monogynia order, belonging to the diandra class of plants. There are 19 species, all of them natives of the East Indies, growing many feet high; some adorned with fine large leaves, others with small narrow ones, and all of them with monopetalous ringent flowers. Only two species are cultivated in our gardens, viz. the *adhatoda* or common Malabar-nut, and the *hyssopifolia* or snap-tree. The first groweth or twelve feet high, with a strong woody stem, branching out widely all around; having large, lanceolate, oval leaves, placed opposite; and from the ends of the branches short spikes of white flowers, with dark spots, having the helmet of the corolla concave. The second hath a shrubby stem branching from the bottom pyramically three or four feet high; spear-shaped, narrow, entire leaves, growing opposite; and white flowers, commonly by threes, from the sides of the branches; succeeded by capsules, which burst open with elastic force for the discharge of the seeds; whence the name of *snap-tree*. Both species flower here in summer, but never produce any fruit. They are propagated by layers and cuttings, and require the same treatment with other tender exotics.

JUSTICIAR, in the old English laws, an officer instituted by William the Conqueror, as the chief officer of state, who principally determined in all cases civil and criminal. He was called in Latin *Capitalis Justiciarius totius Angliæ*. For **JUSTICIAR** in Scotland, see LAW, N^o clvi. 10.—12.

Justiciary JUSTICIARY, or Court of JUSTICIARY, in Scotland. See LAW, N° clvi. 10—12.

JUSTIN, a celebrated historian, lived, according to the most probable opinion, in the second century, under the reign of Antoninus Pius. He wrote, in elegant Latin, an abridgement of the history of Trogus Pompeius; comprehending the actions of almost all nations, from Ninus the founder of the Assyrian empire, to the emperor Augustus. The original work, to the regret of the learned, is lost: this abridgement, being written in a polite and elegant style, was probably the reason why that age neglected the original. The best editions of Justin are, *ad usum Delphini*, in 4to, and *cum notis variorum et Gronovii*, in 8vo.

JUSTIN (St.) commonly called *Justin Martyr*, one of the earliest and most learned writers of the eastern church, was born at Neapolis, the ancient Sechem of Palestine. His father Priscus, a Gentile Greek, brought him up in his own religion, and had him educated in all the Grecian learning. To complete his studies he travelled to Egypt; and followed the sect of Plato, with whose intellectual notions he was much pleased. But one day, walking by the sea-side, wrapt in contemplation, he was met by a grave ancient person, of a venerable aspect; who, falling into discourse with him, turned the conversation by degrees from the excellence of Platonism to the superior perfection of Christianity; and reasoned so well, as to raise in him an ardent curiosity to inquire into the merits of that religion; in consequence of which inquiry, he was converted about the year 132. On his embracing that religion, he quitted neither the profession nor the habit of a philosopher: but a persecution breaking out under Antoninus, he composed *An apology for the Christians*; and afterwards presented another to the emperor Marcus Aurelius, in which he vindicated the innocence and holiness of the Christian religion, against Crescens, a Cynic philosopher, and other calumniators. He did honour to Christianity by his learning and the purity of his manners; and suffered martyrdom in 167. Besides his two Apologies, there are still extant his *Dialogue with Trypho*, a Jew; two treatises addressed to the Gentiles, and another on the unity of God. Other works are also ascribed to him. The best editions of St Justin are those of Robert Stephens, in 1551 and 1571, in Greek and Latin: that of Morel, in Greek and Latin, in 1656; and that of Don Prudentius Marandus, a learned Benedictine, in 1742, in folio. His style is plain, and void of all ornament.

JUSTINIAN I. son of Justin the elder, was made Cæsar and Augustus in 527, and soon after emperor. He conquered the Persians by Belisarius his general, and exterminated the Vandals; regained Africa; subdued the Goths in Italy; defeated the Moors; and restored the Roman empire to its primitive glory. See (History of) CONSTANTINOPLE, n° 98, 102. and ITALY, n° 12. &c.

The empire being now in the full enjoyment of a profound peace and tranquillity, Justinian made the best use of it, by collecting the immense variety and number of the Roman laws into one body. To this end, he selected ten of the most able lawyers in the empire; who, revising the Gregorian, Theodosian,

and Hermogenian codes, compiled one body, called *Justinian's Codex Justinianus*. This may be called the *statute law*, as consisting of the rescripts of the emperors. But the reduction of the other part was a much more difficult task: it was made up of the decisions of the judges and other magistrates, together with the authoritative opinions of the most eminent lawyers; all which lay scattered, without any order, in no less than 2000 volumes and upwards. These were reduced to the number of 50; but ten years were spent in the reduction. However, the design was completed in the year 529, and the name of *Digests* or *Pandects* given to it. Besides these, for the use chiefly of young students in the law to facilitate that study, Justinian ordered four books of institutes to be drawn up, containing an abstract or abridgement of the text of all the laws: and, lastly, the laws of modern date, posterior to that of the former, were thrown into one volume in the year 529, called the *Novelle*, or New Code.

This emperor died in the year 565, aged 83, in the 39th of his reign, after having built a great number of churches; particularly the famous Sancta Sophia at Constantinople, which is esteemed a masterpiece of architecture.

JUSTINIANI (St Laurence), the first patriarch of Venice, was born there, of a noble family, in 1381. He was a very pious prelate, and died in 1485; he left several pieces of piety, which were printed together at Lyons in 1568, in one volume folio, with his life prefixed by his nephew. Clement VII. beatified him in 1524, and he was canonized by Alexander VIII. in 1690.

JUSTINIANI (Bernard), was born at Venice in 1408. He obtained the senator's robe at the age of 19, served the republic in several embassies, and was elected procurator of St Mark in 1474. He was a learned man, and wrote the *history of Venice*, with some other works of considerable merit; and died in 1498.

JUSTINIANI (Augustin), bishop of Nebo, one of the most learned men of his time, was descended from a branch of the same noble family with the foregoing; and was born at Genoa in 1480. He assisted at the fifth council of Lateran, where he opposed some articles of the concordat between France and the court of Rome. Francis I. of France made him his almoner; and he was for five years regius professor of Hebrew at Paris. He returned to Genoa in 1522, where he discharged all the duties of a good prelate; and learning and piety flourished in his diocese. He perished at sea in his passage from Genoa to Nebbio, in 1536. He composed several pieces; the most considerable of which is, *Psalterium Hebræum, Græcum, Arabicum, et Chaldeum, cum tribus Latinis interpretationibus et glossis*. This was the first psalter of the kind printed; and there is also ascribed to the same prelate a translation of Maimonides's *Mores Neochim*.

JUTES, the ancient inhabitants of Jutland in Denmark.

JUTLAND, a large peninsula, which makes the principal part of the kingdom of Denmark. It is bounded on the south-east by the duchy of Holstein, and is surrounded on the other sides by the German ocean.

Justinia ni
Jutland.

JUVENAL, ocean and the Baltic sea. It is about 180 miles in length from north to south, and 50 in breadth from east to west. The air is very cold, but wholesome; and the soil is fertile in corn and pastures, which feed a great number of bees, that are sent to Germany, Holland, and elsewhere. This was anciently called the *Cimbrian Chersonesus*, and is supposed to be the country from whence the Saxons came into England. It is divided into two parts, called *North* and *South Jutland*: the latter is the duchy of Slefwick, and lies between North Jutland and the duchy of Holstein; and the duke of that name is in possession of part of it, whose capital town is Gottorp, for which reason the sovereign is called the *duke of Holstein Gottorp*.

JUVENAL (Decius Junius), the celebrated Roman satyrift, was born about the beginning of the emperor Claudius's reign, at Aquinum in Campania. His father was probably a freed-man, who, being rich, gave him a liberal education, and, agreeably to the taste of the times, bred him up to eloquence; in which he made a great progress, first under Fronto the grammarian, and afterwards, as is generally conjectured, under Quintilian; after which he attended the bar, and made a distinguished figure there for many years by his eloquence. In the practice of this profession he had improved his fortune and interest at Rome before he turned his thoughts to poetry, the very style of which, in his satires, speaks a long habit of declamation; *subactum redolent declamatores*, say the critics. It is said, he was above 40 years of age when he recited his first essay to a small audience of his friends; but, being encouraged by their applause, he ventured a greater publication: which reaching the ears of Paris, Domitian's favourite at that time, though but a pantomime player, whom our satyrift had severely insulted, that minion made his complaint to the emperor; who sent him thereupon into banishment, under pretence of giving him the command of a cohort in the army, which was quartered at Pentapolis, a city upon the frontiers of Egypt and Libya.

After Domitian's death, our satyrift returned to Rome, sufficiently cationed, not only against attacking the characters of those in power, under arbitrary princes, but against all personal reflections upon the great men then living; and therefore he thus wisely concludes the debate he is supposed to have maintained for a while, with a friend, on this head, in the first satire, which seems to be the first that he wrote after his banishment:

*Experiar quid concedatur in illos
Quorum Flaminia tegitur cinis atque Latina.*

"I will try what liberties I may be allowed with those whose ashes lie under the Flaminian and Latin ways," along each side of which the Romans of the first quality used to be buried.—It is believed that he lived till the reign of Adrian, in 128. There are still extant 16 of his satires, in which he discovers great wit, strength, and keenness in his language: but his style is not perfectly natural, and the obscenities with which these satires were filled render the reading of them dangerous to youth.

JUVENCUS (Caius Vetticius Aquilinus), one of the first of the Christian poets, was born of an illustrious family in Spain. About the year 320 he put

the life of Jesus Christ into Latin verse, of which he composed four books. In this work he followed almost word for word the text of the four evangelists: but his verses are written in a bad taste; and his Latin is not pure.

JUXON (Dr William), born at Chichester in 1682, was bred at Merchant-Taylor's school, and from thence elected into St John's college, Oxford, of which he became president. King Charles I. made him bishop of London; and, in 1635, promoted him to the post of lord high treasurer of England. The whole nation, and especially the nobility, were greatly offended at this high office being given to a clergyman; but he behaved so well in the administration, as soon put a stop to all the clamour raised against him. This place he held no longer than the 17th of May 1641, when he prudently resigned the staff, to avoid the storm which then threatened the court and the clergy. In the following February, an act passed depriving the bishops of their votes in parliament, and incapacitating them from any temporal jurisdiction. In these leading steps, as well as the total abolition of the episcopal order which followed, he was involved with his brethren; but neither as bishop nor as treasurer was a single accusation brought against him in the long parliament. During the civil wars, he resided at his palace at Fulham, where his meek, inoffensive, and genteel behaviour, notwithstanding his remaining steady in his loyalty to the king, procured him the visits of the principal persons of the opposite party, and respect from all. In 1648, he attended on his majesty at the treaty in the isle of Wight; and, by his particular desire, waited upon him at Cotton-house, Westminster, the day after the commencement of his trial; during which he frequently visited him in the office of a spiritual father, and his majesty declared he was the greatest comfort to him in that afflictive situation. He likewise attended his majesty on the scaffold, where the king taking off his cloak and George, gave him the latter: after the execution, our pious bishop took care of the body, which he accompanied to the royal chapel at Windsor, and stood ready with the common-prayer book in his hands, to perform the last ceremony for the king; but was prevented by colonel Whichot, governor of the castle.—He continued in the quiet possession of Fulham-palace till the ensuing year 1649, when he was deprived, having been spared longer than any of his brethren. He then retired to his own estate in Gloucestershire, where he lived in privacy, till the restoration, when he was presented to the see of Canterbury; and in the little time he enjoyed it, expended, in buildings and reparations at Lambeth-palace and Croydon-house, near 15,000 l. He died in 1663; having bequeathed 7000 l. to St John's college, and to other charitable uses near 5000 l. He published a *Sermon on Luke xviii. 31.* and *Some considerations upon the act of uniformity.*

IVY, in botany. See *HEDERA*.

IXIA, in botany, a genus of the monogynia order, belonging to the triandria class of plants. There are several species, consisting of herbaceous, tuberous, and bulbous-rooted flowery perennials, from one to two feet high, terminated by hexpetalous flowers of different colours. They are propagated by off-sets, which should be taken off in summer at the decay of the leaves:

JUXON,
IXIA.

leaves: but as all the plants of this genus are natives of warm climates, few of them can bear the open air of this country in winter.

IXION, in fabulous history, king of the Lapithæ, married Dia the daughter of Deionius, to whom he refused to give the customary nuptial presents. Deionius in revenge took from him his horses: when Ixion, dissembling his resentment, invited his father-in-law to a feast, and made him fall through a trap-door into a burning furnace, in which he was immediately consumed. Ixion being afterwards flung with remorse for his cruelty, ran mad; on which Jupiter, in compassion, not only forgave him, but took him up into heaven, where he had the impiety to endeavour to corrupt Juno. Jupiter, to be the better assured of his guilt, formed a cloud in the resemblance of the goddess, upon which Ixion begat the centaurs: but boasting of his happiness, Jove hurled him down to Tartarus, where he lies fixed on a wheel encompassed with serpents, which turns without ceasing.

JYNX, in ornithology, a genus of birds belonging to the order of accipitres. Of this genus there is only one known species, called, from its singular manner of twisting its head about, *wry-neck*. "Nature, (says Mr Pennant), by the elegance of its penciling the colours of this bird, hath made ample amends for their want of splendor. Its plumage is marked with the plainest kinds. A list of black and ferruginous strokes divides the top of the head and back. The sides of the head and neck are ash-coloured, beautifully traversed with fine lines of black and reddish brown. The quill-feathers are dusky; but each web is marked with rust-

coloured spots. The chin and breast are of a light yellowish brown, adorned with sharp pointed bars of black. The tail consists of ten feathers, broad at their ends and weak; of a pale ash colour, powdered with black and red, and marked with four equidistant bars of black. The tongue is long and cylindric; for the same use as that of the woodpecker. The toes are also disposed the same way. The bill is short, weak, and a little arcuate. The irides are of a yellowish hazel.

"The wry-neck we believe to be a bird of passage, appearing here in the spring before the cuckoo. The Welsh consider it as the forerunner or servant of that bird, and call it *Gwas y gog*, or the cuckoo's attendant: the Swedes regard it in the same light. The food of this species is insects; but chiefly ants, for on examination we found the stomach of one filled with their remains. As the tongue of this bird, like that of the ant-bear or tamandua, is of an enormous length; it possibly not only makes use of it to pick those insects out of their retreat, but like that quadruped may lay it across their path, and when covered with ants draw it into its mouth. Its weight is one ounce and a quarter: the length seven inches; the breadth 11. It takes its name from a manner it has of turning its head back to the shoulders; especially when terrified: it has also the faculty of erecting the feathers of the head like those of the jay. Its note is like that of the kestrel, a quick-repeated squeak. Its eggs are white, and have so thin a shell that the yolk may be seen through it. This bird builds in the hollows of trees, making its nest of dry grass, in which we have counted nine

DIRECTIONS for placing the PLATES in this VOLUME.

Number of Plates.				Number of Plates.			
129, or	Plate CXV.	To face	Page 3222	160, or	Plate CXLIV.	To face	Page 3586
+ 130	2 ^d CXV.	- -	3257	161	CXLV.	- -	3588
131	CXVI.	- -	3360	162	CXLVI.	- -	3594
132	2 ^d CXVI.	- -	3360	163	CXLVII.	- -	3600
+ 133	CXVII.	- -	3368	164	CXLVIII.	- -	3604
to	to	- -	3368	165	CXLIX.	- -	3610
151	CXXXV.	- -	3372	166	CL.	- -	3612
152	CXXXVI.	- -	3420	167	CLI.	- -	3688
153	CXXXVII.	- -	3468	168	2 ^d CLI.	- -	3784
154	CXXXVIII.	- -	3474	169	CLII.	- -	3793
155	CXXXIX.	- -	3474	170	CLIII.	- -	3796
156	CXL.	- -	3474	171	CLIV.	- -	3836
157	CXLI.	- -	3474	172	CLV.	- -	3836
158	CXLII.	- -	3474	173	CLVI.	- -	3836
159	CXLIII.	- -	3474	174	CLVII.	- -	3836

In all, 46 Plates for this Volume.

N. B. ERRATA, OMISSIONS, &c. noticed and supplied in the APPENDIX at the end of the Work



